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Event and Comment.

The Quality of Queensland Butter—A Notable Success.

It is very pleasing to note the success obtained by Queensland butter and cheese manufacturers in the Australian Open Championship Classes at the competition held under the auspices of the Australasian Butter and Cheese Factory Managers and Secretaries' Association in Melbourne, said Mr. Forgan Smith, Acting Premier and Minister for Agriculture, when referring recently to the notable success obtained by the Wide Bay Co-operative Dairy Association in winning the Australian Open Championship for butter. Queensland has definitely placed itself in the forefront with other leading butter and cheese manufacturing countries. In recent years our butter has more than held its own in competition with the product of other States and countries, among the most notable successes being Mundubbera's first place at the Islington Show, England, in keen competition from all parts of the world; Oakey's second place in the world's competition at New Zealand, being but half a point behind the winner; and now in the Australasian Championship, in which Queensland factories secured first and second places in the butter section, and second and third places with cheese.

The winning butter was produced by the Wide Bay Co-operative Dairy Association's factory at Gympie, which was recently rebuilt at a cost of over £60,000, and is now claimed to be the largest butter factory in Australia. Departmental officers report that the product of the new factory has shown a distinct improvement. Maleny has also improved its factory equipment, with the result that its butter has been grading consistently well for some time.

The managers of these factories, Mr. B. C. Cumming (Gympie) and Mr. G. Newton (Maleny), are congratulated on their success. Both these gentlemen have

always shown a keen desire to bring their product to the highest quality, and well deserve their win. The factories which won second and third places in the Cheese Championship are owned by the Downs Co-operative Dairy Association. This company has recently made special provision for the supervision of its cheese factories.

Owing to the unfavourable climatic conditions prevailing at the time the cheese was manufactured, the Queensland product was by no means at its best. Had it been made a month later, it is certain that cheese of a much higher quality would have been submitted for competition from this State.

Departmental Economic Committee.

The need for general inquiry into the basic factors of land settlement, agricultural production, and marketing systems was stressed recently by the Minister for Agriculture (Mr. W. Forgan Smith), when referring to the work of the Economic Committee now functioning in his Department. Mr. Smith said that the farmer was one of the first to suffer during any periods of economic depression, and in order to establish ways and means of reducing losses and wasted effort from which agriculture suffered, the Departmental Economic Committee had been appointed.

It was felt that what was required was intelligent direction and economic harmony in the agricultural industry. The committee, as a result of its investigations, would, it was expected, be in a position to give sound advisory service to the farmer on the economics of his industry in relation, particularly, to the varying production cost factors in different districts; the advisability or otherwise of adjusting production to demand in respect of certain of his crops; and primary factors affecting crop cultivation, areas to be cropped, cycles of over and under production, and cycles of high and low demand in relation to certain crops, changes in ease of production or in demand, seasons, weather, and accidental causes.

The committee was not giving attention to the economic position of the dairying industry, and had taken a wide survey of its problems. It was realised conditions throughout the State varied vastly, particularly in respect to soil, climate, and rainfall. This variation in seasonal and other circumstances had been recognised by the committee, and in its deliberations allowances had been made accordingly.

Up till now the committee had given consideration to land values, cost of improvements, necessary plant and equipment, cost of stock, labour costs, general working expenses, economic production of dairy cows, so as to determine the payable production limit, analysis of average production of cows, tested under the departmental herd-testing scheme, the minimum number of cows required to be kept in order to assure a living wage and a reasonable return on capital invested, fodder conservation, field and storage costs, financial assistance required to enable the dairyman to store against lean periods of production, methods of improvements of dairy stock, and stock food values.

Two members of the committee were now obtaining first-hand information from producers in selected dairying districts. This information would be of much assistance to the committee in arriving at decisions on which sound advice and guidance might be based.

A Libel on Queensland.

Mr. A. J. Jones, Minister for Mines, as Acting Premier in the absence of Mr. Forgan Smith in the South, had this to say in the course of a recent commentary on certain of the contents of a "Handbook on the Commonwealth of Australia," issued by the Oversea Settlement Department of the Dominions Office, London:—

"It seems to me that one has only to look to London to be told of anything that is bad about Australia—of floods and droughts, of intense heat and hardships, of reptile and other pests, of forest fires and wind storms."

Some of the assertions, Mr. Jones held, constituted a libel on Queensland, and he said he had communicated with the Agent-General on the matter.

It was claimed that the "Handbook" contained official information regarding openings for settlers, land settlement schemes, wages and hours of labour, cost of living, and assisted passages and fares, and had been revised to 1st July last. Respecting Queensland and sugar planting in this State, said Mr. Jones, the "Handbook" stated:—"There is a demand for the white labourer in the cane fields of Queensland and Northern New South Wales, but the work, especially in Northern Queensland, is unsuited to new arrivals from the United Kingdom. The climate in the North is tropical, hot, and moist in the rainy season, from January to March, and hot and dry at other times. In the South the climate is less trying, but even here it is doubtful whether a newcomer could stand the conditions until he has become acclimatised. . . . Any person intending to take up work in the canefields of Queensland would be well advised to start in the South, or in New South Wales.

They should arrive not later than May, which is the busy time, and would thus have a few months of comparatively cool weather before the hot season begins in November."

The foregoing certainly misrepresented the climate of Queensland, said the Minister. Only recently an Englishman who had spent the previous twelve months in Queensland, visiting every part of the State, including the far North, and was about to return to the old country, wished him good-bye, adding that it was with the greatest regret that, business having called him away, he was leaving Queensland, and that he wished he could take with him to England "some of Queensland's delightful climate."

It was, indeed, a fact, continued Mr. Jones, that so healthful was the climate of Queensland that the death rate was the lowest of the Australian States, and the second lowest in the world.

He (Mr. Jones) was indignant at the statements in the "Handbook" in question—statements calculated to do Queensland a great deal of harm and which, certainly, would not induce immigration to the State. Consequently, and in view also of the fact that the contents of the "Handbook" were to be revised in July of this year, he had cabled to the Agent-General for Queensland in London (Mr. J. Huxham), asking him to endeavour to have the erroneous statements withdrawn, and to see, if possible, that any future publications dealing with Queensland conditions were first submitted to him for revision, thus obviating the inclusion of incorrect information.

Queensland's Agricultural Legislation Commended.

The Acting Premier (Mr. W. Forgan Smith) informed the Press recently that he had received a letter from Mr. C. Freeleagus, Consul-General for Greece, intimating that the Greek Government had requested him to forward a copy of Queensland's Primary Producers' Organisation and Marketing Act, which was passed last session. In his letter to the Acting Premier, Mr. Freeleagus said that he thought this information would be of interest to the Government, and added, "that the request from his Government for the copy of Queensland's legislation was a pleasant surprise to him, in so far as it spoke well of this State's legislation."

The Acting Premier also made available to Press representatives an excerpt from the March issue of "Empire Production and Export," a journal published in London as the official organ of the British Empire Producers' Organisation, a body which is well known throughout the world. Commenting on the last report presented to Parliament by the Director of the Council of Agriculture, that journal regards it as "a document of the highest importance," and goes on:—"As long ago as 1924 we commented on a previous report from the same source and on the same subject, and commended it to the notice of the (British) Minister of Agriculture as being suggestive of a system of co-operation, co-ordination, and control which, if applied here, might save British agriculture, and raise it from the rut of depression in which it has been for far too many years. The material contained in this new report has more than justified our faith in the system and our confidence in its effectiveness as a panacea for our own agricultural ills. Complete representation of the producers has been secured by a theoretical division and subdivision of the organisations connected with the production of specific commodities, and the appointment of delegates for each resultant section. By these means mutual co-operation of all branches of the agricultural industry is assured, and on this basis of confidence and co-ordination, much excellent work has been done in the direction of safeguarding interests, stimulating production, improving marketing methods, and prosecuting research. The only pity is that Queensland's organisation should be practically unique."

Mr. Smith added that it was indeed gratifying to receive such appreciative reference to the efforts which the Queensland Government is making to assist the producers, and it was also indicative of the interest which is taken in Queensland agricultural legislation in other parts of the world.

Banana Grade Standards.

The Secretary for Agriculture (Mr. W. Forgan Smith) has announced that grade standards for bananas have been gazetted by the Victorian Department of Agriculture. It is understood Victoria intends to enforce these regulations, which provide that all Cavendish bananas shall be packed according to size, and the variation in length of fruit in any one case shall not exceed $1\frac{1}{2}$ inches. No bananas measuring below $5\frac{1}{2}$ inches in length by 4 inches in circumference shall be allowed to be marketed. When varieties other than Cavendish are marketed, the name of the variety shall be marked on the case. All measurements in length are to be taken on the outside of the curve, from the junction of the fruit at the stem-end to the top of the fruit.

Bureau of Sugar Experiment Stations.

CANE DISEASES.

The Director of the Bureau of Sugar Experiment Stations, Mr. H. T. Easterby, has received the following report (10th May, 1927) from Mr. E. J. F. Wood, Assistant to Pathologist:—

BUNDABERG DISTRICT.

Two diseases are of wide occurrence in this area—Mosaic and Gum. More restricted in distribution are Leaf Stripe and Root Disease. Hiau was not observed this year, possibly as most of the planting has been late, and the young cane is not yet showing symptoms. It is also possible that the rapid growth of the cane during the recent rains has not allowed it to get a hold.

Gum has been observed at Fairymead, Tantitha, and is widespread in the Woongarra from Spring Hill to Windermere and down to Elliott Heads. In a few cases the farmers who have 100 per cent. infection, are asking "What can I do?" and are apathetic on the subject. Gum is a disease which, by its varied characteristics, and its sporadic outbreaks, has long puzzled the plant pathologist, but gradually the factors which govern it are becoming known. The long suspected presence of an insect vector has, as far as I know, never been actually proved, but is hardly doubted. This accounts for the sudden and unexpected appearance so characteristic of the disease, while the relation of the gum bacteria to weather and soil conditions, and possibly to hydrogen on concentration of the cane juice, would all tend to the elusive nature of gumming outbreaks. Resistant varieties still remain the chief method of control, though it seems that the resistance of a variety is liable to diminish. The growers of the Woongarra are fortunate in having the variety Q. 813 to fall back on. In one area it is standing practically unharmed, while Badila and N.G. 16 nearby are 70 per cent. to 100 per cent. gummed. Moreover, it seems to do very well, and, if gum is to be controlled in the Bundaberg district, it will have to be called to mind the part which Malabar is playing in the control of gum in the Northern Rivers; and Malabar has a very low c.e.s., while that of Q. 813 is high.

Badila and N.G. 16 are badly affected, as is also M. 1900 Seedling and D. 1135. If these canes are to be grown, seed selection will have to be practised, and it is always advisable to bring the seed cane from a free or lightly gummed area. The majority of Badila and N.G. 16 is grown by companies, and these should find little difficulty in obtaining healthy seed.

E.K. 28 and H.Q. 285 are also susceptible to gum, and care should be taken to keep them free.

Mosaic was present on every farm visited, but usually to a small extent. Rigorous seed selection and subsequent eradication is having its effect in most areas. Black Innis is a dangerous friend owing to its high susceptibility. Shahjahanpur 10 has actually been planted out on one farm at Bucca, and has been ratooned on several farms on Barolin road. The eradication of this cane is essential if Mosaic is to be fought. It is useless to attempt any control measures till this step is taken.

The river farms at Avoca, Oakwood, and Sharon, also at Wallaville, are badly infected, and afford a problem of control.

River Farms.—H.Q. 285, the staple variety, is rather susceptible, and is very badly affected on the river. As this is the only early maturing cane grown in this area the position is a difficult one, as seed selection where infection is greater than 60 per cent. is a difficult and costly matter. The other alternative is to bring plants from a lightly-infected area after due selection, and to form a buffer area of Q. 813, which is the leading late maturer in these river lands, between the old infected cane and the imported clean seed.

Frequent plantings (*i.e.*, few ratoon crops) would be a necessary factor of control in such cases, and it might be well to rotate varieties, replacing Q. 813 by H.Q. 285, and *vice versa*. The cleaning up of these plantations should be commenced from the direction of the prevailing wind, and the clean seed cane planted to windward of the infected varieties, with, if possible, a buffer area of Q. 813. This

should mean a rapid method of control. Systematic work by the farmers as a body is the only thing which will relieve the Mosaic situation on the river lands.

At Wallaville all varieties, including Q. 813, are badly infected with Mosaic, due solely to the planting of infected seed. Q. 813 is even here markedly less infected than other varieties, though it shows the damage more. This gives rise to the fallacy that Q. 813 is susceptible. It is resistant but intolerant. In this area clean seed must be brought from the hill farms and planted to windward. Then seed selection should control the situation. It will pay to import seed rather than to plant infected cuttings.

The loss due to Mosaic is often not apparent except to an observer who can visualise the true productivity of the soil, as compared with its actual productivity. The farmer, living on the soil, accustomed to estimate crops with Mosaic, does not see the damage, and it is hard for him to believe the extent of it; 5 tons per acre loss is not unusual in heavily-infected fields.

A peculiar case of high secondary infection was seen at Currajong on a hillside farm. Seed selection had been practised from a M. 1900 Seedling block, less than 1 per cent. infected. The cane had been planted on a newly cleared hillside facing an infected block of D. 1135 on the other side of the valley. Assuming that no selection had been practised we would still have a field approximately 2 per cent. infected, though the number of diseased stools and, therefore, the centres of infection would be greater. But selection was practised, and there is now at least 20 per cent. infection, which shows the symptoms of secondary infection, usually in the very early stages of growth. This infection is still going on, and it is significant that the cane leaf hopper (*Perkinsiella saccharisida* Kirk) is very prevalent. No aphids were observed. As the hillside is not stumped, control will be a difficult matter, and replanting the M. 1900 S. and D. 1135 blocks simultaneously as soon as is possible is the only method. It is observed here as elsewhere that while secondary infection occurs readily from one hillside to that facing it—i.e., across a valley—it rarely spreads across a ridge, the conclusions being that the light insects are wind borne rather than that they fly of their own volition, and that it is difficult to descend on a slope facing to leeward. The particular farm mentioned is fortunate in that the infected area is in this way screened from the rest of the farm.

Leak Stripe was not observed at Hill End or Windermere where it has been reported previously. It is still infesting several fields at Bingera, and as it is caused, by a fungus the spores of which are wind borne, it should be stamped out as soon as possible by roguing—otherwise it is liable to become epidemic. It can be distinguished from Mosaic by—

- (1) The more definite stripes on the leaves;
- (2) The presence of a white downy appearance (fungus mycelium) on the lower leaf surface;
- (3) The frequent elongation of the affected stick, and the ribboning of the leaves (this is in the later stage).

Root diseases are prevalent also, especially in the Woongarra in the shape of Peg Leg or Foot Rot, and of Leaf Sheath fungus. *Marasmius sacchari* was observed in fructification on cane on the Burnett Heads road and at Fairymead, and was causing death due to strangulation in both cases. It is considered, however, that the fungus is merely a secondary agent and that the primary cause is soil infertility. In the "Hawaiian Planters' Record," xxvii. 4, p. 259, Dr. H. L. Lyon quotes Dr. Kuyper:—

"In the great majority of root rot cases an excess of water in the soil is the first cause to think of; in a great many cases, even on light soils a temporary excess of water could be shown as the detrimental element with a fair degree of certainty.

"A factor of decided influence upon the occurrence of the disease is a change in the moisture content of the soil," &c.

W. T. McGeorge, "Hawaiian Planters' Record," vol. xxix. 2, p. 167, states—

"In our own soils several possible primary chemical physical and bacteriological factors suggest themselves, and all have been found to be definitely associated with soil infertility."

Thus, better drainage, better tilth, and the application of the necessary fertilizer as shown by analysis of the soil, or better by actual trial, seem to be the control measures of this type of disease.

Mention may also be made of slight occurrences of nematodes and of canckilling weed (*Striga*) along the road to the Elliott River, but these are of minor importance, as the farmers are already seriously attacking them.

CANE PESTS.

The Director of the Bureau of Sugar Experiment Stations, Mr. H. T. Easterby, has received the following report (18th May, 1927) of observations for the period April-May, 1927, from Mr. G. Bates, Assistant to the Southern Entomologist of the Bureau:—

***Rhyparida Morosa* Jac.**

This shiny black beetle has been particularly plentiful in canefields during the past few months, more especially in dirty paddocks and fields adjacent to the river banks, but no actual damage has been reported. It belongs to the family Chrysomelidae, or plant-eating beetles, and sometimes invades canefields in thousands and feeds upon the foliage. It is in the larval stage, however, that serious damage may be caused. The grubs eat the eyes of the set and tunnel up the young shoot, thereby killing the plant. Although widely distributed throughout Queensland, it is only occasionally that serious damage is caused, but in limited localities this pest is capable of playing havoc with young plant cane.

Soil fumigation with either carbon bisulphide or paradichlorobenzene has been recommended against the grubs, and with a view of controlling the adult beetle a series of experiments were carried out to test the relative value of lead arsenate and calcium arsenate as killing agents.

Beetles were collected and caged with the growing plant. The leaves were moistened with water and the poison dusted on. Results show that calcium arsenate kills quicker and gives a relatively higher mortality than lead arsenate, besides being cheaper to apply, as calcium arsenate is about one-third the price of lead arsenate. The following table gives the percentage kill over certain periods:—

	Mortality.				
	1st Day. Per cent.	2nd Day. Per cent.	3rd Day. Per cent.	4th Day. Per cent.	5th Day Per cent.
Lead arsenate ..	6	45	50	85	93
Calcium arsenate ..	20	61	70	86	90

Grubs.

Grubs of a large Dynastid beetle have found plentifully in cane land close to the sea-coast, notably at Elliott Heads. During the early part of March, in a block of spring plant cane, portion was found to harbour from three to seven large grubs per stool. These grubs were then in the third stage and nearly full grown, yet the cane showed no outward signs of grub damage. This block was again inspected two months later (May), and there were still no signs of the cane having received a set-back. I am of opinion that this species, being largely a humus feeder and feeding also on the hard portion of the stool rather than the young roots, will not be responsible for any serious injury to cane. However, it is being bred at the laboratory, and its habits studied, in case it ever warrants control measures. An allied species, *Dasygnathus australis dejeani* MacL., is recorded as a cane pest in North Queensland.

Grasshoppers.—Several species of grasshoppers, including *Locusta australis* *Sav.* ~~Burr.~~ and *Locusta danica* Linn., are numerous just at present on cane headlands, but so far no damage has been recorded. When in swarms these can be controlled by means of poison baits, and the following has given good results:—

Bran, 25 lb.; Paris green or arsenic, 1 lb.; lemons or oranges, six finely chopped fruits; molasses, 2 quarts; water, 2 gallons.

This mixture is sown broadcast in early morning at the rate of about 10 lb. per acre.

The Christmas Beetle (*Anoplognathus boisduvali* Boisd.)

These beetles were noticed as late as 20th April feeding on a species of *Eucalyptus*. These trees were, however, close to the town, and some little distance away from any cane paddocks. The larvæ, which are of economic importance as a cane pest in North Queensland, are quite common in canefields in this district.

Cane Killing Weed (*Striga* sp.)

This weed made its appearance in two canefields in the Bundaberg district during the last month, but caused very little damage, prompt action being taken by the farmers concerned and the weed destroyed.

The Soldier Fly (*Metaponia rubriceps* Macq.).

As reported previously, this insect caused damage to cane in isolated patches at Tantitha this year. On visiting this portion of the district on 1st May it was found that the flies had emerged in large numbers and were to be found clustered thickly over grass and cane leaves. This matter will be dealt with more fully in a subsequent report.

Official Insect Collection.

As mentioned in a previous report a collection of insects associated with cane, together with their parasites and predators, is being collected for reference purposes. This work is steadily going on, and growers are invited to visit the laboratory and become familiar with the various insects with which they may have to contend.

FIELD REPORTS.

The Southern Field Assistant, Mr. J. C. Murray, reports (27th April, 1927):—

The crop for the coming season should be fairly heavy. New varieties which have never previously had a good trial owing to adverse climatic conditions are now proving their value, or otherwise. Several new canes are showing decidedly better than the staple varieties. By staple varieties D. 1135 and 1900 Seedling are principally meant. The following details were noted in the districts visited:—

Booyal.

Cane varieties making a good showing here are Q. 1098, H. 227, N.G. 16, Q. 813, E.K. 1, M. 1900 Seedling, B. 146, H.Q. 285, E.K. 28. New canes growers are advised to try carefully are H. 227 and E.K. 28. The latter is fairly well known and the H. 227 can generally be distinguished by its leaves, which are very erect after the manner of D. 1135. The E.K. 1 is now doing much better than the writer originally thought it would, and is finding a good deal of favour with the growers.

Dallarnil.

Cane here is looking well. Long haulage has, in the past, been against the farmers, but if they get a turn of seasons like the present, the good crops will compensate them for this. Canegrowers here and elsewhere are advised to do as much green manuring as possible, also, if they can, to carry out manurial experiments. It pays to fertilize, provided the correct ingredients are used. Remarks regarding varieties at Booyal apply to this area.

Maryborough.

Cane here is looking well and should harvest a good crop. Varieties making a good showing are H. 227, Q. 813, H.Q. 285, and M. 1900 Seedling. Growers are recommended to be careful in regard to disease, and follow carefully the instructions given by the field officers of the Bureau. H. 227 is making a good showing, both in plant and ratoon. One grower at Melrose has a very good crop of this cane, although as yet on a small scale. E.K. 1 is also beginning to attract the attention of cane farmers here. Growers in this district, as elsewhere, should remember that fallowing is a cardinal principle of farming. It is an operation as old as agriculture. Mosaic law demanded that all farm land must be fallowed once every seven years. It seems we still have lessons to learn from Pharoah's dream and the Book of Moses.

Pialba

This beautiful district has seldom looked better than it does at present. The ground has had a thorough saturation, too much in fact, but nevertheless some fine cane is in evidence. Varieties looking well are H. 227, E.K. 28, Q. 813, N.G. 81, H.Q. 285, M. 1900 Seedling, and D. 1135, also E.K. 1. This is a group of thoroughly good varieties, with the exception, perhaps, of D. 1135, and growers in Southern Queensland should make a note of the fact.

Farmers in this area are very keen on variety experimentation and co-operation with field officers of the Department.

Bauple.

A very good season is promised. Practically all the growers have good crops, some having quite exceptional growths of cane. Excessive rain since Christmas has retarded planting operations. Work at the mill is proceeding smoothly and efficiently, the machinery being overhauled pending a start towards the end of winter.

Growth of cane varieties is worthy of note, however, particularly E.K. 28, Q. 813, H.Q. 77, and E.K. 1. Other varieties doing well are H.Q. 285, D. 1135, H. 227, and M. 1900 Seedling. The writer has noticed from time to time that in relation to variety nomenclature the growers are a little at sea regarding the meaning of the letters. It can be explained that "D" is for Demerara, "B" for Barbados, "H" for Hawaii, "N.G." for New Guinea, "M" for Mauritius, "H.Q." for Hambleton, Queensland, "Q" for Queensland or that group of canes raised by the Queensland Acclimatization Society. The letters "H.Q." were given to a group of seedlings raised by the C.S.R. Company at Hambleton.

Farmers are recommended to be careful of disease, using only plants that have been taken from healthy stools.

The Southern Field Officer, Mr. J. C. Murray reports (17th May, 1927):—

Nambour.

The cane in the Nambour district is backward, principally owing to the prolonged dry spell before Christmas and heavy flood rains during the months of January, February, and March. The Maroochy River, for the first time for many years, overflowed its banks and almost covered the cane. In a few cases the cane was actually washed away. Only the legends of the blacks record such a flood before. The effect of this flooding will be beneficial, however, as silt deposits so formed greatly add to the fertility of the soil.

Varieties.

Under this heading will be discussed staple and experimental varieties. By "staple" is meant those canes wherewith the farmers are making a living, and by "experimental" is meant those varieties that are being experimented with. In the Nambour district staple varieties are H.Q. 285, Q. 813, D. 1135, Badila or N.G. 15, and M. 1900 Seedling.

Principal Characteristics.—H.Q. 285: Quick growth, early maturing, good sugar content, low fibre content, fairly disease resistant, wilts from frost, but often recovers rapidly, no standover properties, good milling cane. Early spring planter. Practically all growers should have 15 to 20 per cent. of this cane.

Q. 813.—Mid-season maturer, high c.e.s., low point of resistance to grubs, good striker, resistant to disease infection (apparently), but very susceptible to injury by disease, good milling cane, free trashier. Should be always planted on a well-drained soil and never cut before September nor after December. Taken altogether, a very valuable variety. Introduced to this district about 1918 by the Bureau of Sugar Experiment Stations, and distributed and made known by the Bundaberg Sugar Experiment Station, the writer, and others.

D. 1135.—A cane brought from Demerara about 1895 by Young Bros., of Fairymead. Has been a very good cane, but years of indifferent plant selection have caused deterioration and susceptibility to disease. Healthy cane of this variety would be difficult to obtain in this district at present. D. 1135 has shown some "sports" of high quality in recent years, one known as D. 1135 Sport, a thicker and softer cane than the original, being fairly frequently seen in the Bundaberg area.

Badila.—This cane is a variety that really only grows to perfection in the tropics. It is one of Tryon's collection, having been brought originally from New Guinea by that gentleman. Its appearance and habits are well known. Owing to slow growth in the southern part of the State this cane is not generally recommended in these latitudes. For fully twelve months in the life of a two-year Badila crop the farmers are unable to work down the rows, and the soil in some instances may get in a bad physical condition. This does not apply to the North, however, where Badila can be harvested annually.

M. 1900 Seedling.—This is a well known Queensland staple variety. Grows well on high well-drained soils. Shows no great resistance to pests or diseases. Is a late maturer with a high c.e.s. content. A good milling cane, and any farmer who

has volcanic soil of average fertility could profitably grow it. Shows a fair point of resistance to drought and frosts.

Experimental varieties are H. 227, Q. 1098, E.K. 28, E.K. 1, H.Q. 77, Q. 970.

Characteristics.—H. 227: This variety was brought from Hawaii some years ago and is now showing considerable promise when it has been given a fair trial. According to figures H. 227 is extensively grown in the Hawaiian Islands. Its erect growth enables the grower to plant more closely than usual, and the big stools hold the ground tenaciously. Farmers are requested to persist with this cane and should remember that it takes a number of years to fairly try a new variety.

Q. 1098.—This is a very good cane in general. It thrives well on alluvial soils. In colour like Q. 813; the leaves are not so plentiful, are a darker green, and more erect. Growers should keep this cane in mind and try it on their farms.

E.K. 1 and E.K. 28.—Both these varieties are excellent canes and by no means should they be discarded, except upon special advice. The c.e.s. content of each is high and both are weighty luxuriant growers, given a fair season. These two varieties are fairly well known to the farmer so that there is no need for a detailed description.

H.Q. 77.—This is a heavy cane of high sugar content, but not a prolific stooler. Grows well on almost any type of cane land and is more and more coming into favour. Further particulars of this or any other variety could be obtained by getting in touch with the writer, care of Bundaberg Sugar Experiment Station.

Q. 970.—This is another of the group of "Q" seedlings. A good ratooning cane. Q. 970, though not particularly resistant to disease, is nevertheless a cane every grower should try. Do not place on a headland and leave to the tender mercy of the weeds and insects, but give a good trial under typical conditions.

Soil and Drainage.

No soil, no matter how rich, is of the least value unless effectively drained. Growers in this district recognise that fact, and, collectively, have spent thousands of pounds on drainage. To improve the soil after drainage lime could be used. Growers who have used lime on soils such as these dense river deposits say they have had excellent results. The land in such cases is referred to as sour and can best be made fertile by lime.

Diseases.

There is nothing fresh to comment upon since last visiting this district. The Mosaic disease can be controlled by plant selection, and the gum epidemic of the year before last has this year lost its virulence. The growers are advised to be unceasingly careful in plant selection.

Mr. E. H. Osborn, Central District Field Assistant, reports (29th April, 1927):—

HOME HILL.

When last inspected in November, the country was under extreme drought conditions, the cane only being kept alive by the gradually diminishing underground water supply, whilst all other vegetation was dying out rapidly. Now, however, thanks to the rains of January and February, the whole country looks beautifully green, with the creeks and lagoons carrying plentiful supplies of water. Crop prospects are very fair, considering what a bad year 1926 had been for the Burdekin growers. The early planted cane ranged from good to medium, but the late planted crops were only medium, except in odd places.

The ratoons would only be classed as ordinary except in a few odd cases where fertilizers had been used.

Cultivation.

Much activity was evident everywhere. All makes of tractors were well represented, and as the weather was hot and muggy their work was much appreciated, apart from their usefulness for pumping purposes.

Varieties.

Badila (N.G. 15), B. 208, Clark's Seedling (H.Q. 426), M. 1900, Goru, Q. 813, H.Q. 285, and E.K. 28 are the principal canes grown, the first three being in most favour.

Badila is one of the very best, but in odd places suffers from Top Rot. B. 208 gives extremely high density returns, but will not stand a check in growth, and is also very liable to disease. H.Q. 426 upon medium to poor land is an excellent cane, but seems to be rather slipping back in yield. E.K. 28 is becoming very popular and some beautiful stands of same were seen, one block planted as late as September looking a picture. To show its popularity it was noticed growing in twelve farms amongst twenty-four visited in one week, and in nearly every case it looked ahead of the other canes.

Wherever the writer discussed the cane, emphasis was laid upon the fact that so far the best returns from the variety are expected to be obtained on medium to poor land. Q. 813 should also pay upon the poorer soils.

Diseases and Pests.

Top Rot in N.G. 15, B. 208, M. 1900, N.G. 24 B (Green Goru), and Q. 813 was scattered throughout the area, but in isolated patches.

White ants were noticed in odd stools near headlands or adjoining dead timber. In such cases poisoning with arsenic, caustic soda, and molasses mixture would benefit.

AYR.

Activities here were confined principally to the Pioneer area, the greatest portion of which was inspected in company with the Cane Inspector (Mr. C. Wyrtter).

Conditions on this side were about the same as upon the Home Hill side, but the January flood had certainly done more damage, for besides small patches of flooded cane, fences and fluming had been carried away in odd places. Here also the soil was in a caked condition after such flooding, rendering cultivation very difficult, but subsequent rains enabled ploughing operations to be carried on again. Before the rains a certain amount of first ploughing had been carried out, with the result that there are now some splendid crops of green stuff to plough under. Where the second ploughing has been done the soil is breaking up beautifully.

Present indications are that the planting for 1928 will be very large on the Burdekin. Crops are from good to medium. The early plant is rather below the generally high standard of the Burdekin, while the later planted crops suffered so much from dry conditions that they are certainly upon the light side, very poor stooling being noticeable, and quite a number of such crops will cut in the vicinity of only 10 or 12 tons per acre. The ratoons in general were also light, with the exception of a few crops that had been fertilized with ammonia or soda; they stood out on their own in every case.

Varieties.

These are practically similar to those upon the Home Hill side, with the possible exception that there is probably more Pompey (7 R. 428) upon the northern side of the river, and principally grown upon the Kalamia Estate, where a high tonnage with a medium density is claimed. Of the canes growing throughout the area E.K. 28 has increased greatly in favour, and nearly three-fourths of the growers seem to have from a small plot to a decent-sized paddock. One of the most characteristic blocks seen was at Mr. J. Murphy's Airdmillan farm. This is an 18-acre block upon medium forest land, planted in July and grown entirely without water, which should cut between 32 and 35 tons per acre, and is a marked contrast to some B. 208 planted in same paddock at same time.

Another splendid block was seen at Klondike (September plant), which was easily ahead of any other late planted cane.

Green Manuring.

Green manure is only used to a limited extent in the area for, unless favourable weather is experienced at sowing time, watering is necessary. About the largest user is the Kalamia Estate, which has steadily gone in for it during the past few years, with the result that its benefits are plainly seen in all cane to harvest this year, whether plant, first, or second ratoon.

The ratoons N.G. 15, 7 R. 428, and H.Q. 426 were also fertilized with nitrate of soda and have made into a fine crop. For this season some 123 acres have had peas or beans ploughed in, with a further 63 acres to be planted in 1928; so evidently the Kalamia management are satisfied with regard to its benefits.

Diseases.

Top Rot in N.G. 15 and M. 1900 was scattered about, but in genral not as bad as other years. One or two farms at McDesme and Klondike were very bad in odd patches, as was another farm at Airdmillan. Sooty Fungus was noticed in H.Q. 426 at both sides of the river. Leaf Stripe was noticed in nearly all the paddocks where B. 208 was growing, in odd stools in many paddocks, but in others the cane was very heavily diseased. In several places the disease was very bad, where the owners of such farms had been repeatedly advised of the danger of still continuing to plant such a cane, without, at all events, trying to get clean seed from elsewhere. From the number of paddocks carrying Leaf Stripe this year, the disease is rapidly spreading, and growers are again cautioned against trusting too much to such a cane. Mosaic was noticed in H.Q. 426 in an Airdale farm within 200 yards of where the writer first found it about two years ago, but only to a limited extent.

GIRU.

Only a very brief visit was possible here, the outstanding feature of the area being the wonderful improvement in the crops since my last visit in November. The prospects were then very cloudy, but at present it seems probable that, including the Ingham Line, some 60,000 tons of cane will be harvested.

As on the Burdekin, some of the best cane seen was two paddocks of May plant E.K. 28 carrying good stools and fair length of cane.

Some very good third and fourth ratoons N.G. 15 and H.Q. 426 were also noticed upon a river farm, which should make into a very nice crop.

The Central Field Officer, Mr. E. H. Osborn, reports (20th May, 1927):—

MACKAY.**North Eton.**

Since my last visit early in the year a great change has come over this particular area, the rain having completely altered the doubtful outlook to quite a promising one. Present indications point to a crop of somewhere in the vicinity of 60,000 tons, including, of course, the Oakenden cane.

The tramline is well under way and should be in order for the crushing. Grass and weeds were naturally very much in evidence, the headlands especially being overgrown. Everywhere ploughing operations were being carried out, and some planting.

Through the courtesy of the Queensland Producers' Association, who very kindly provided the means, I was enabled to visit some twenty-two farms, principally in connection with disease detection, with the following results:—

District.	Farms visited.	Carrying Mosaic.
Barrie	8 ..	2
North Eton	8 ..	4
Brightley	6 ..	2
Totals	22 ..	8

Mosaic was found in the following varieties:—

E.K. 28 plant—light, in 1 farm.

D. 1135 plant—light, in 1 farm.

M. 1900 plant—light, in 2 farms.

Malagache plant—light, in 2 farms.

Innis plant—light, in 1 farm.

Badila ratoons—badly, in 1 farm.

Pompey (7 R. 428) plant—light, in 1 farm.

Pompey (7 R. 428) ratoons—badly, in 2 farms.

In the course of a subsequent meeting at Eton, stalks showing Mosaic were shown to interested growers, and means for eradication outlined. It was very gratifying to notice the interest taken by growers in matters pertaining to diseases.

Mount Martin.

A large proportion of this area is practically new, for I understand that it is only about four years ago that cane replaced cattle hereabouts. In the area heavy dark soils predominate, parts of which would be benefited by the use of lime as a means of sweetening the soil and making it more friable; lower lying portions now carrying dense masses of grass could be profitably put under cane after draining.

Canes showing up well here are M.1900, Q.813, H.Q.426, E.K.28, Badila (N.G.15), and Malagache, some very good crops of each being noticed, and ratoons of Badila (N.G.15) were looking particularly well.

Diseases and Pests.—Mosaic, seemingly the chief disease in these areas, was found in three farms—i.e., in one farm in N.G.38 ratoons, light; one farm in M.1900 plant, light; one farm in H.Q.426 (Clark's Seedling) plant, to a very much larger extent. Disease symptoms were well recognised, and much local interest taken in control measures advocated.

Grubs were observed to be very active in a corner of a paddock of N.G.15, and may probably show up more in the near future. Borers, too, were noticed in odd stools of Q.813 and H.Q.426 adjoining headlands, but not to any appreciable extent.

Kungurrie.

Some exceptionally nice cane was noticed between here and Dow's Creek, more especially at the Kungurrie end of the railway. The soil varies to a great extent from rich dark volcanic soil on the foothills and hillsides to a dark stiff alluvial and a greyish forest soil. On the volcanic soil some splendid cane was noticed, some Badila and M.1900 first ratoons showing very fine growth. Nearly very good N.G.15 plant looked very well. On poorer classes of soils Q.813 was seen to be ratooning very well, especially when one remembers what a bad year 1926 was.

Pompey (7 R.428) was also cropping well and is credited with good density upon certain classes of soil, but is so patchy that growers are chary of planting more than a small area. Q.970 looked well, both in plant and ratoons. It is said to mature about a month later than Q.813, but seems to give better ratoons than Q.813.

Particular attention to disease was given, but out of nineteen farms visited Mosaic was seen in M.87 on only one, and to a very slight extent there; local growers were advised not to get seed from any other area unless absolutely convinced that it was clean.

Pests.—Grubs were noticed on some half dozen farms, principally at the Kungurrie end, in one case doing very heavy damage, nearly every variety of cane suffering. Borers were also seen to be doing minor damage in several places, generally adjoining headlands. While in the area the writer was surprised at the quality of the citrus fruits growing, beautiful orange and mandarin trees being much admired. The hill slopes with their rich and slightly stony soils should be good for banana growing; also from a scenic and climatic point of view Kungurrie is amongst one of the most favoured spots that the writer has visited in the Mackay area.

Mirani.

This centre looked very well, the crops presenting a healthy appearance and showing in most places a very even growth. Active farm operations were noted upon all sides. Tractors and horse-drawn ploughs were working full time everywhere.

Generally, the ground was in fair order, and a certain amount of planting had already been carried out, for most growers are trying to plant up before crushing operations take up all their time.

Of cane varieties Q.813, M.1900, and H.Q.426 (Clark's Seedling) are the most popular, with the first-named easily the favourite.

Only a small quantity of E.K.28 was noticed, but in each case it compared very well with other varieties as far as growth was concerned. One very fine crop of Pompey (7 R.428) plant was showing splendid stools of heavy cane looking very healthy. Near Marian a block of B.208 had stooled out well, but had not made extra good growth.

Diseases.—Some nine farms were inspected, of which only one was showing Mosaic. This farm, a particularly well worked one, was showing the disease very

badly in plant H.Q. 426 in two separate paddocks. Mosaic markings were even noticed on some young H.Q. 426 plants, maybe two months old.

The owner was fully advised of the danger to his crop and also to neighbouring ones, and strongly advised not to plant any more land with this seed, for such cane now being used for plants shows up Mosaic to quite a large extent. He has no Q. 813 on his own farm, but was strongly advised to purchase some from nearby areas.

The Northern Field Assistant, Mr. A. P. Gibson, reports (22nd April, 1927):—

TULLY DISTRICT.

Tully had a phenomenal fall of rain the first two months of the year, 52.26 inches being recorded in three days; such a deluge occasioned widespread flooding, great alarm, and destruction. The mill floor was inundated to a depth of 11 inches, and the railway station yard by 7 feet. Had the town been built adjacent to the station where it was desired by many, loss of life and much destruction obviously would have resulted.

Rainfall—January, 34.58; February, 65.65; total, 100.23 inches.

Five thousand eight hundred acres were harvested last year for the Tully mill and yielded 131,715 tons; to this total must be added the amount crushed from South Johnstone area, viz., 16,291 tons, making a total of 148,006 tons. The greatest tonnage of cane crushed in any one week of forty-four hours was 7,289 tons.

The town and its surrounding cane fields continue to develop. More scrub has been felled and further areas planted to cane. For some months past clearing operations have been made difficult and costly owing to the prevailing wetness which has prevented the fallen timber drying, and promoted undesirable vine and undergrowth, the former quickly over-running the lying, tangled mass, and preventing a satisfactory burn. Fortunately, most of the timber is suitable for mill firewood, and when cut into desired lengths is removed from field to factory by portable trams and trucks. The money received for this fall assists materially in meeting the very heavy clearing costs.

The Crop.

Some dry weather has followed the wet, and this most welcome sunshine has already proved of untold benefit to the industry in general. The crop for the greater part consists of N.G. 15 (Badila); interplanted among this kind in parts are stools of H.Q. 426, which in growth is really outstanding, being fully 2 feet in advance of the surrounding cane. Generally, the entire crop possessed a fine healthy colour and was making wonderful progress. It had apparently suffered little by wind, and to a very much lesser degree by water than generally expected. The maximum amount of damage was noted on the somewhat alternating lands of the Lower Tully; here several great riverside basins held the water for many days, hence the increased destruction. Consideration in the near future should be devoted to the draining of such cavities. Fine patches of N.G. 15 (Badila) plant were observed throughout the area, possibly running in the vicinity of 50 tons per acre; such weighty crops it may be said are too far advanced at this time of the year, for during the wet and windy weather the root anchorage is found insufficient to keep the weighty crop standing. Recumbent canes generally shoot and produce aerial roots and become damaged by scalding brought about by the action of rain and sunshine.

Planting.

The time of planting, variety, condition of land, and season, of course, have a decided bearing on the progress or otherwise of a crop. It is, however, wise to plant in these parts immediately after the area is freed of its encumbrances. Insufficient attention is devoted to the mode of planting; too close planting in loggy or unploughable virgin land seems a mistake. The stubble is expected to produce for many years prior to renewing, therefore stool expansion room is desired, otherwise grass-like stems may result. Five feet between the drills, with seed interspaces ranging from 2 feet 6 inches to 3 feet should give satisfaction.

Cane harvested during November and December last year had grown astonishingly; 8,500 acres probably will be harvested this season. At present this area looks surprisingly well and is estimated to yield 180,000 tons.

Pests and Diseases.

Leaf hoppers are more numerous here than elsewhere. It is highly possible that fewer of its parasites are present. Leaf Scald was not largely noticed this inspection, although known to be very prevalent in parts. It is known that fields which appear healthy early in the year are likely to be severely affected later in the season. Top Rot was considered severe in some of the Lower Tully River Farms, one or two canes in many stools had died from the effects; chocolate to red leaf streaks were abundantly found. Much Leaf Sheath Fungus was noticed; this is one which occasions the binding of leaf sheath to stem.

The mill overhaul work is being carried on. Much of the sand ballast along the mill railroads had been removed by the flood water. The farmers intend building about $1\frac{1}{2}$ mile of 2-foot line, commencing at a point adjacent to Mr. Allison's farm and extending to Birkalla. When this is completed it will bring forward the harvested cane on the small trucks in preference to the big.

INNISFAIL DISTRICT.

Temperatures for the month, generally, were very warm and muggy with an unusually low rainfall up to the 27th, when rainy conditions set in and the month's total was greatly raised.

Rainfall for March, 20.8 inches; total for year, 82.81 inches.

Rainfall at Experiment Station, 18.42 inches; total for the year, 81 inches.

A more hopeful view is now taken of the coming seasonal crop. Last month's storm retarded the crop growth fully three to four weeks. This month the prevailing weather conditions have been marvellously suitable, and in consequence the foliage and root damage occasioned has speedily made good and the great probability of the seasonal tonnage eclipsing that of last year now seems assured.

Flooded Cane.

Most tops have rolled off the more severely damaged flooded cane, stems have sprouted badly, and Army worms are now destroying the leaves. The Goondi crop obviously had suffered to a greater extent from wind and water than did its neighbouring mill areas, due to the fact that it possesses more land subject to flooding and a higher percentage of Pompey (7 R 428), a somewhat brittle and faster growing variety. About 5 acres of cane on a riverside farm at Daradgee were deeply and completely covered by flood debris and the root crop mostly ruined. Removing this encumbrance will entail much work. Badila growers are a bit concerned over the abnormal sprouting of stems, which doubtless must have an ill effect on the crop if continued. This condition is more pronounced where the stems are directly exposed to sunlight. It is highly possible that this has been occasioned by the temporary non-functioning of tops, for it is known that when a top is damaged, shooting immediately follows.

Leguminous Crops.

It is pleasing to note that the area planted to cover crops is on the increase. The torrential February rains had considerably damaged many very promising crops. The favourable weather conditions of this month, fortunately, had permitted its recovery. Rice bean or Jerusalem pea is fast becoming a favourite. It possesses many excellent qualifications; the spreading of this has been curtailed owing to the inadequate supply of seed.

Cultivation.

Interspace cultivation has hardly been possible this month owing to the tangled and advanced nature of the crop, therefore field operations have been mainly confined to the ploughing in of cover crops, the preparation of land prior to planting, and headland cleaning.

Grubs.

At Daradgee the ever-spreading brown patches among the green indicate those parts infected; these patches are more pronounced on the hillside farms near the standing scrub. Upward of fourteen grubs were found under upturned stools; these were of two distinct sizes, therefore suggesting the probability of two beetle flights. The destruction, however, is small compared to that of last season. The weevil-borer has not been very active this year so far. It is generally thought that the season has been favourable for the breeding of its parasite and less favourable for the pest. Tachinid flies have been abundantly found on the northern side of the

North Johnstone River, such a beneficial increase, it is considered, is due principally to the greater percentage of standover cane usually left in these parts. Leaf Scald noted, more or less, throughout the area, and a malady killing the lesser cane shoots in parts and known as the Banded Sclerotial Leaf disease.

MOURILYAN.

The crop destruction is considered much less now than first expected. About 98 per cent. of the crop is N.G. 15. This was looking well and growing vigorously. Liverpool Creek had reported a record flood, and in consequence the crop there had suffered. Grubs were found damaging young can in four fields at the beginning of February. Leaf Scald showing up strongly in H.Q. 426 and Goru family of canes. A block of Badila near Liverpool Creek was considered dangerously affected, and the following precautions were recommended:—

- (1) Not to use cane from this field for seed;
- (2) Sterilize well the used knives after cutting the area;
- (3) When cut, immediately plough out and plant to beans, and make sure the old stubble is killed before replanting with cane.

Real leaf rust was located on the leaves of Goru.

A very small percentage of flooded cane showing dead heart had recovered. In such instances the heart arrow, not the growing point, had been injured. When the growth was resumed the decomposed heart was slowly forced out and a new but temporary deformed top resulted. On the present face of things it would appear that crushing operations may not commence as early as desired. The following are the individual district mill crushings of last year, and that approximately estimated for this:—

	1926.	1927.
Tully	148,006	180,000
Goondi	170,006	153,000
Mourilyan	135,473	160,000
South Johnstone	165,927	207,000

El Arish and Jaffa.

Forward patches of cane were observed. The progress of the crop harvested after Christmas was not to be compared with that completed before. Generally, the crop seemed further advanced than last year. Further small areas had been cleared and planted. Badly diseased paddocks have been ratooned when they should have been ploughed out. Better crops would result by renewing some of the too old stubbles. Standover cane was found recumbent, sunburnt, shooting, and slightly rat eaten.

Leaf Scald is still very prevalent in parts.

Big moth borer was responsible for dead hearts in ratoons, especially among cane in the dirty and wet places. On the 22nd, 23rd, and 24th March innumerable very fast-flying dark-brown moths were noted travelling northward the whole day long. The body of this moth was black encircled by six creamy bands.

The Northern Field Assistant, Mr. A. P. Gibson, reports (9th May, 1927):—

INNISFAIL.

Innisfail is a wonderfully rich and picturesque cane-producing district, possessing great possibilities. It is the home of four of Queensland's greatest mills. South Johnstone Mill had its maiden run in 1916; it has been controlled by the Government since its inception and has milled 1,395,354 tons of cane since that year. The annual crushings are as follow:—

Year.	Cane Crushed.		
	Tons.		
1916	56,205		
1917	81,584		
1918	47,106	(Reduction due to cyclone)	
1919	86,554		
1920	126,017		
1921	120,686		
1922	107,897		
1923	173,862		
1924	232,257	(Sent to Goru)	12,262 tons)
1925	197,744	(Sent to Tully)	19,469 tons)
1926	165,442	(Sent to Tully)	16,291 tons)
11 years	Total ..	1,395,354	(Sent to other mills .. 48,022 tons)

Recently the management of the South Johnstone Mill was offered to its suppliers on certain conditions. The growers from the outset unanimously agreed to accept such conditions. A farmers' directorate and a staff to manage same has been appointed, and they were to take over on the first day of May.

An efficiently balanced mill can only economically grind a given cane tonnage per hour. This, of course, is more or less influenced by the variety and its fresh or stale condition. Therefore it is highly desirable to have harvested cane milled as soon as possible. Too much cane (the result of unrestricted planting combined with the injudicious practice of ploughing out and immediately replanting) has, at times, occasioned friction and probable losses to producer and manufacturer. It is computed that 10,347 acres of cane will be harvested this year, particulars of which are as follows:—

Standover	719 acres.
Plant cane	2,756 "
First ratoon	1,888 "
Second ratoon	1,610 "
Other ratoons	3,374 "

10,347 acres.

(This does not include unpermitted cane.)

The seasonal average cane tonnage per acre may be put down at 20 tons; this being so, some 9,000 acres annually harvested should yield enough cane to keep this factory profitably engaged.

Weather.

Copious rains were experienced the first two weeks, after which the rainfall was somewhat scanty.

Rainfall, Innisfail.—January, 17.01 inches; February, 45.42; March, 20.08; April to 28th, 11.86; total, 94.37 inches.

The Crop.

The 1927 crop is estimated at 207,000 tons. This is composed mainly of N.G. 15 (Badila) and isolated patches of H.Q. 426, which was growing vigorously and like its neighbouring areas presented a fine appearance. Generally, it had been little harmed by wind or water, and so far to a lesser degree than usual by pests. Flooded cane patches had been left to take their chance.

The make-up and physical character of our cane soils differ very much, consequently it is obviously impossible without analysis or some accurate knowledge to form a definite opinion as to what manure to profitably apply. There is a general deficiency of vegetable matter, more especially in our volcanic red and coarser granite soils. This apparent deficiency upsets the soil balance, and, besides reducing its fruitfulness has the tendency of increasing destruction by grubs, for it seems the larvæ have found the cane roots more palatable than their native food. This waning matter may be restored by the ploughing in of cane trash or preferably one of the several popular leguminous crops raised. It is difficult to convince our growers of the great all-round benefit to be derived from this practice.

Manuring.

Molasses, although costly to apply, would, I think, be of untold benefit, especially on the volcanic red soils.

Mode of application—

- (1) Plough medium depth drills with 5 feet interspaces.
- (2) Place suitable tank on a dray having two taps and outlets, regulated to directly empty into drills on either side of the dray as it proceeds steadily along (for distant fields, rail and tank trucks might be found to apply the waste product cheaper).
- (3) After a short time level by harrow, and cross plough, so as to thoroughly mix with the soil.

The following is rather interesting, and one of many convincing molasses experiments conducted on a 35-acre red soil patch on a Bundaberg plantation:—

Fifteen acres had a dressing of $5\frac{1}{2}$ tons waste molasses per acre; cost of application 5s. per ton, approximately 27s. 6d. per acre. A prolific crop of maize was raised and ploughed in. Crop produced 57 tons cane per acre, c.e.s. 12.01 per cent., value then 27s. 11d. equals £79 11s. 3d. per acre.

Ten acres—No molasses; previously grub infested; two indifferent maize crops ploughed in. Cane produced 39.6 tons per acre, c.e.s. 13.26 per cent., value then 32s. 4d. equals £64 0s. 4d. per acre.

Both areas planted same time; both areas received $3\frac{1}{2}$ cwt. per acre of "777" fertilizer.

The 15 acres were harvested about two weeks prior to the 10 acres. The c.e.s. it will be seen was higher where molasses was not applied. Nevertheless results show marked increase in cane tonnage from molasses—17.4 tons, nearly 47 per cent., value £15 10s. 11d. per acre.

Sulphate of ammonia: 160 lb. of this had been applied to some of the more backward cane fields this month. Some acres of maize were sandwiched among the cane, the seed of which had germinated favourably, but overmuch rain had badly stunted its growth. Mosaic disease was plentiful in this crop. Maize perishes earlier than does cane, and being similar we are told that the corn aphid (considered to be a virus carrier of this complaint) moves to adjacent fields, hence one of the reasons given for its spreading.

Leguminous crops were being ploughed in. The rice bean was heavy in flower and should yield seed enough to plant a big area for 1928. Innumerable, active, medium-sized banded flies having a high pitched note when on the wing were noted among its vegetation, probably parasitic to some of its pests.

At Japoon a rather light scrub was being felled, logged, burned, holed by mattock, and planted for £20 per acre.

Most mill locomotives are busy hauling in the seasonal fuel requirements; this is becoming more costly and difficult to procure. Although the 1926 season was a big one, a large stock of unburnt wood remained. Better and more economical work in the factories has very considerably reduced the amount of fuel required to manufacture 1 ton of sugar, thus cheapening the cost of production. Growers and would-be growers at Silkwood and Liverpool Creek are discussing the need of another mill. The time, however, is not opportune; when it is, better business perhaps would result by enlarging the South Johnstone factory, thus treating the extra tonnage under the one roof.

The wonderfully interesting "sensitive plant," with its gaudy purple-headed flower, is spreading rapidly in the enclosed area, but controlled by the stock on the roads.

BABINDA.

Wet weather was encountered here, consequently my duties were greatly hampered. The increased price paid for cane has strengthened the position of the farmers, and at present many tractors are being bought. The 1926 crop was a great all-round success, finishing with 5,130 tons better than estimated. 195,130 tons of cane were crushed from 9,325 acres; 2,084 tons of this total were unpermitted. The general mill average was exceptionally good, being 14.2 c.e.s. 300 acres of cane were not sufficiently advanced to cut at the season's end, consequently was left to carry over.

The 1927 crop had not been seriously damaged by wind, water, or pests, therefore the present prospect is again distinctly encouraging. Some 9,500 acres to cut is forecasted to yield 190,000 tons. The whole area at the beginning of the month had been well soaked, consequently cultural activities were suspended for a time. The valued filter-press cake was being trucked to the various farms and deposited by the road side; it is unfortunate that paddocks are unprepared to immediately receive the manure, thus saving extra handling costs and losses by leaching.

Cultivation.

It is not too much to emphasise the more thorough preparation of land prior to planting, and the need of an improved drainage system; this is of great benefit to subsequent crops. Alluvial and likewise local district volcanic soils possess isolated small unfruitful patches among the surrounding good. One of the several things mentioned below may occasion this:—

(1) An impervious subsoil at a shallow depth or a deficiency of plant food or foods.

(2) A severe, local, slow, underground fire where a stump has been baked out, thus destroying humus and probably nitrifying bacteria.

(3) Toxic theory, where the roots of a previously growing plant have ejected a something in the soil detrimental to subsequent growing crops. Analyses made of the bad and surrounding good soils should aid us in determining what is required.

Pests and Diseases.

Grubs, weevil, and bud moth borers—the former two mentioned present really a serious problem, and at all times call for most urgent action. Grubs have been more or less active since February; the time is fast approaching when they will

go down in the soil to hibernate, consequently their destruction is waning. The severest losses have occurred in the vicinity of Daradgee, Japoon, Eight-mile, Harvey Creek, Bellenden Ker, and Q.N. Bank Estate, adjacent to the Russell River. The larva could not be found in several of the grub-damaged patches that were examined. Termites (white ants) were found devouring the grub-damaged stubble at Daradgee.

Weevil borer not very active so far; it is evident they are becoming so. Bud moth borers were seriously damaging the eyes of cane.

Diseases.—Leaf Scald widespread; Banded Sclerotial Disease on leaf and sheath. The fungus responsible for the former is less operative; this is generally more acute in wet periods. The latter sheath fungus mentioned binds the sheath to stem and commonly is responsible for what is known as spindle or needle top. Bleached erratic markings surrounded by red on young leaves, probably due to a fungus interfering with the chlorophyll. The writer noted a similar complaint on the leaf blades of the Russell River couch grass. Fast flying brown moths mentioned in my Jaffa notes were plentifully found at South Johnstone on the lantana flowers.

Farmers at Bartle Frere declared that lightning had killed small patches of cane; such destruction was grub-like.

Babinda has been operating for the past twelve years and has crushed 1,690,267 tons of cane.

Weather and Crops.

Rainfall: Babinda.—January, 21.39 inches; February, 53.69; March, 18.88; to 12th April, 23.05; total, 117.01 inches.

1927 prospects at Innisfail and Babinda continue to look bright. Most fields especially the plant is progressing favourably. Some ratoons are shabby and growth disappointing.

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On another page an order form may be found, and for those whose annual subscription is about due what is wrong with filling it up now and posting it direct to the Under Secretary, Department of Agriculture and Stock?

THE SAN JOSÉ SCALE

(*Aspidiotus perniciosus* Comstock).

By HUBERT JARVIS, Entomological Branch.

The San José Scale was first noticed at San José, California, in 1873, and on its discovery in the surrounding districts it became known as the San José Scale although its original home is probably China. It is believed that it was first introduced into Australia on nursery stock in 1894. Since that date its spread has been rapid, and it is now present wherever deciduous fruit trees are grown throughout the Commonwealth of Australia.

Host Plants.

The San José Scale has been found on nearly all deciduous fruit trees such as apple, pear, plum, peach, and cherry, and, in addition, it is known to attack a very large number of other cultivated trees and shrubs, over 100 different species being recorded as host plants of this destructive scale. In the Stanthorpe district the English hawthorn is one well-known host plant of the San José Scale, and doubtless there are others, such as the willow, poplar, elm, and osage orange, which are all growing in the district, and on all of which this scale has been found in other countries.

Appearance of Injury.

In the early stages of infestation the San José Scale is extremely difficult to detect on the old wood of most deciduous fruit trees, but on the fruit, young wood, and leaves (Figs. 8, 9, and 10) the scales are conspicuous as brown specks, surrounded by a pink discoloration, which forms a ring around the scale. This is particularly noticeable on the fruit (Fig. 8). As infestation increases the bark of the tree assumes a roughened appearance, the patches of scale appearing darker in colour than the healthy wood. When badly infested by this destructive insect the whole tree appears as if covered with a brownish-grey scurf; this scurf, when viewed through a hand lens, will be seen to be composed of countless numbers of minute scales which, when rubbed with the finger, will exude a yellow oily fluid.

On badly infested trees, usually a branch here and there will die first, and finally the whole tree perishes; it is possible for the scale if left unchecked to kill a tree in three seasons.

On peach and plum trees the scale may be looked for on any portion of the trunk or branches; on the apple, pear, and cherry, however, it is more often met with on the younger wood and fruit, and sometimes on the leaves.

Life History.

A large number of the adult scale insects perish during the winter, as do also many of those half and quarter grown, but an ample supply of immature scales survive to start an infestation in the spring, when, as soon as the sap begins to rise, the insects become active and grow rapidly.

The female scales (Fig. 6) which are more numerous than the males are circular in outline, convex in shape, and have a nipple-like

boss or prominence at the apex of the scale. They are greyish-brown in colour, and in general shape not unlike a minute tent. The female scale, when full grown, is about one-twelfth of an inch in diameter (about as big as a pin's head). The male scale (Fig. 7) is more elongated than the female, its width being usually about half the diameter of the female scale, and its length twice as great as its own width.

The scale insect proper develops underneath the scale. The female is a curious, legless, segmented, yellow insect (Fig. 5), somewhat circular in form; she never leaves the protection of the scale. When mature, she gives birth to living young which crawl from under the scale and swarm over the branches of the host tree. Each scale insect is furnished with a hair-like sucker or beak, which it inserts into the tissue of the host plant, thereby sucking up the sap and speedily weakening the tree.

The sexually mature male is a tiny two-winged insect (Fig. 2) just visible to the naked eye. The first hatching of males usually takes place in the early spring.

The newly-born scale insects are just visible to the naked eye as tiny yellow specks, and they may often be observed crawling actively over the branches of the host tree. They move about freely for a few hours; they then settle and become stationery and legless, inserting their hair-like sucker into the tissue and quickly secreting the waxy scale which soon completely covers them.

In about a month after birth the mature male insects emerge and mate with the females, which in about another two weeks give birth to young. The life cycle of the female scale is, approximately, from five to six weeks, and several generations are possible during one season. The rate of increase is very great, each female being able to produce about 400 young. The rapidity with which this pernicious insect can increase will thus be easily realised, and also the need for prompt control measures on its discovery.

Distribution.

San José Scale may be carried from one orchard to another in various ways. Birds alighting on an infested tree, when the young scales are active, undoubtedly carry the insects on their feet from one orchard or district to another. The same possibility applies to tree-frequenting insects such as flies, green grasshoppers, beetles, &c. It is also possible for the young scales to be carried by strong winds or on the clothing of any person brushing against a scale-infested tree.

Another source of distribution is the importation of nursery stock, scions, grafting material, &c. The danger of this should be fully realised, and all such material should be fumigated prior to its being sent out, and immediately on its reception.

Natural Enemies.

As natural enemies of the San José Scale, two species of ladybird beetles are of importance, and wage unceasing war against the scale. The species referred to are *Orcus australasiae* and *Rhizobius* sp. The first beetle mentioned is about one-eighth of an inch in length and nearly as broad, steel blue in colour, and marked with six small orange spots on the wing covers.



FIG. 1.



FIG. 3.

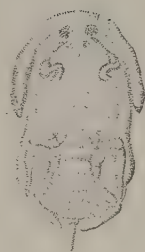


FIG. 2.



FIG. 4.



FIG. 5



FIG. 6.



FIG. 7.



FIG 9



FIG 8.



FIG 10.

W. Helmsing
1927

PLATE 123.—THE SAN JOSÉ SCALE (*Aspidiotus perniciosus* Comstock).
(For Description of Plate, see page 517.)

The *Rhizobius* beetle is not much more than one thirty-second of an inch in length, rounded in shape, and of a greyish colour, marked with two reddish spots, one on each wing cover. Both the larvæ and adults of these two beetles greedily devour the San José Scale, and when numerous must act as a considerable check to its increase.

The larvæ of a small Tineid moth also prey on the San José Scale in the Stanthorpe district, and in certain seasons it becomes a predator of importance. The caterpillar when full grown is about three-eighths of an inch in length; it is slender in form and very active, and lives entirely on the scale which it covers in with a fine web under which the caterpillar works. The moth, *Batrachedra* sp., measures about three-eighths of an inch in length across the expanded wings. It is of a uniform greyish-yellow colour, with its hind wings beautifully fringed at the edges.

A minute parasitic wasp is also known to attack the San José Scale in Queensland, and this parasite was bred in numbers from the scale in the Stanthorpe district. This wasp has been identified as *Coccophagus clariscutellum* Girault.

Yet another check to the increase of San José Scale is the parasitic fungus *Sphaerostilbe coccophila*. This fungus is recorded as destroying both San José and other scales of the same genus in different parts of the world.

Some of our small birds, although acting as carriers of the scale, also play some part in its control, an examination of the stomach contents of certain species having invariably revealed scale insect tests. These birds have often been observed, both by the writer and also by fruit-growers, on scale-infested trees feeding on the scale. The species more particularly alluded to are the brown tit warbler, *Acanthiza pusilla*, and the short-billed tree tit, *Smircornis brevirostris*.

Control Measures.

When a tree is heavily encrusted with San José Scale and is in a seriously weakened condition, it is far better to dig it out and burn it than to apply any spray, but when a tree is only partially infested San José Scale can be effectively controlled. The best sprays to use against this scale are either miscible oils or lime sulphur; both are effective if properly prepared and used.

Oil sprays are easy to mix and apply, and are cheaper than lime sulphur. They are, moreover, claimed to be more effective than the lime sulphur spray. Many growers, however, prefer the lime sulphur wash, and in this matter each orchardist must decide for himself. Lime sulphur has undoubtedly fungicidal properties, which are wanting in the miscible oils.

If it is decided to use oil, a well known and reliable brand should be obtained. It should be used at a strength of one part of oil to thirty or forty parts of water. It is important to make sure that a perfect emulsion is made first. This can be accomplished by taking one gallon of oil and one gallon of water, and pumping the mixture from one vessel to another three or four times; a perfect emulsion will thus be secured, and it can then be broken down to any strength required.

One spraying should be applied during the dormant season (mid-winter) at a strength of one in thirty, and as the young scales become

active on the approach of spring, another application of the spray should be made just when the buds begin to swell. This latter spraying should be at a strength of one in forty; at this period the young scales are particularly vulnerable.

Summer sprayings for the control of San José Scale are not worth while, as at best they are only a partial check to its increase. The two sprayings mentioned should be sufficient to effectively control this scale.

An oil emulsion should not be used during the growing season on deciduous fruits, as injury to the foliage may result. Soft water should always be used if possible, as hard water will sometimes set free particles of oil. The addition to the spray of a weak solution of Bordeaux will overcome hard water trouble.

If lime sulphur is preferred to a miscible oil spray, either the commercial or home-made lime sulphur are equally effective.

Concluding Remarks.

Although so serious a pest, the San José Scale can be controlled in any orchard where it is present by well directed effort. It must be realised that the area occupied by this destructive insect is still increasing, and a determined co-operative effort should be made towards its control.

Neglected scale-infested trees or orchards should be cleaned up, as one such orchard in any district is simply a nursery for the scale, and is not only a menace to uninfested orchards, but is also a serious adverse factor hindering success in the work that may be accomplished by progressive growers in attempting to control this pernicious insect pest in the orchards in which it is already established.

DESCRIPTION OF PLATE.

PLATE No. 123.

- Fig. 1.—Young larva x 57.
 - Fig. 2.—Pupa of male x 57.
 - Fig. 3.—Adult male x 32.
 - Fig. 4.—Colony of scales in various stages of development x 4.
 - Fig. 5.—Adult female x 32.
 - Fig. 6.—Adult female scale turned over to reveal the insect itself x 12.
 - Fig. 7.—Male Scales x 12.
 - Fig. 8.—Pear fruit, showing infestation.
 - Fig. 9.—Apple twig, showing infestation.
 - Fig. 10.—Plum twig, showing infestation.
-

"SHOULD BE IN EVERY FARMER'S HOME."

"A Millmerran farmer writes (14th May, 1927):—'The *'Agricultural Journal'* I have taken for years and it should be in every farmer's home, for it contains valuable information. I have often to turn up back numbers for some information I want to know.'"

By L. L. GUDGE, Chief Government Cotton Classifier.

During the above-mentioned seasons, the seed cotton received (for ginning) was given very little if any attention as regards segregating the different qualities. The price of 5½d. per lb. for seed cotton which the Government guaranteed applied only to cotton of good quality and cotton free from disease. This term "good quality seed cotton" meant cotton that was not of ratoon growth and which was clean; it did not apply to immature, stained, dirty, or otherwise damaged cotton. Seed cotton which was not defined as "good quality" might be rejected or subjected to a lesser advance. Ratoon cotton was to get an advance of 3d. per lb. and was not to be mixed with annual.

The comparatively large crop harvested in 1922 showed the limitations of this system of receiving and ginning the seed cotton. Many of the bales were plated, mixed packed, or generally uneven in grade and quality. The buyers overseas were also dissatisfied with the lack of uniformity of the cotton contained in the bales. It was apparent that some system of grading would have to be established. The grower himself was getting a false impression of the value of cotton and of the necessity for clean picking. Moreover, it was realised that if Australia hoped to establish a reputation for cotton on the world's markets it could only be accomplished and maintained by a proper and uniform system of grading. During this period the cotton which was being grown was produced from seed of mixed origin. The bulk of it was "Upland" in type and descended from several varieties that had been introduced from time to time, and which also had become crossed in the field with Egyptian and other long staple varieties, with the result that the staple was very uneven. In view of this fact and taking into consideration the lack of cotton classifiers capable of this type of work, it was decided to concentrate on the grading only and to leave the stapling alone until such times as cotton from a pure variety of seed was being produced and men were trained in the method of stapling cotton. The production of seed cotton during these years was as follows:—

Year.	Seed cotton lb.
1919-1920	57,065
1920-1921	940,125
1921-1922	3,876,677

In the early part of 1923 the question of grading received serious consideration, more especially as the crop that was about to be harvested was much larger than had ever been produced in a single year before, and also that unsatisfactory comments had been made by the overseas brokers on the irregularity of the cotton which was directly attributable to the lack of a system of grading.

A conference was held between officers of the cotton section of the Department of Agriculture and Stock and the officials of the British-Australian Cotton Association, which resulted in a system of grading of the seed cotton being adopted for the forthcoming crop. The grades were simplified as much as possible with the idea of having a good distinction between the grades, and to limit the number as far as possible. The grades were to be lettered alphabetically as shown by the following table, which also shows the lint grades that each grade of seed cotton should produce when ginned:—

Seed Cotton Grade.	Corresponding Lint Grade.	Guaranteed Price.
A	{ Middling Fair Strict Good Middling }	d. 5½
B . . .	{ Good Middling Strict Middling }	5½
C	Middling	5½
D	Strict Low Middling	5
E	{ Lower Grades }	4
F		3

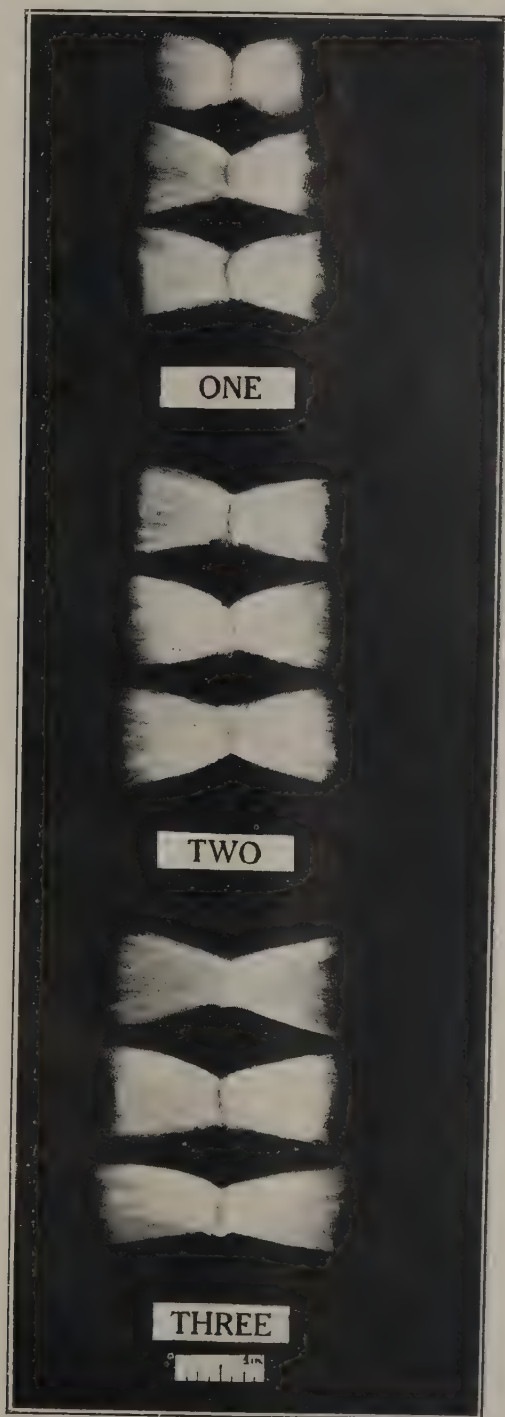


PLATE 124.—ILLUSTRATING STAPLE CLASSES OF SEED COTTON.

The grades were approved by the Minister, and each ginnery was supplied with a representative set of grade samples in order that the men who were to do this grading would have a standard to guide them. Temporary men were employed on this work, and the diversity of the styles of cotton harvested during this fairly large crop, showed how necessary it was to have a system of grading in order to segregate the different qualities before ginning.

Ratoon cotton was received and ginned separately at the Rockhampton and Whinstanes ginneries. This cotton was ginned without previously being graded.

The Durango type of seed cotton which had been grown on various farms throughout the cotton area was sent to Whinstanes ginnery, where it was treated entirely separately from the other seed cotton and the seed was kept for future planting. This cotton was classed for both grade and staple, and the different qualities were matched up in order to make uniform bale lots. The quality of this cotton was excellent, and the length of staple of the bulk of the cotton averaged 1.3₁₀. The grade was largely Strict Good Middling to Middling Fair. Samples of this cotton were sent over to the United Kingdom and were very favourably commented upon by the brokers. The production of this class of cotton amounted to thirty-six bales of lint.

The grade percentages and total quantities of lint production at each ginnery were as follows:—

Grade.						Rockhampton.	Wowan.	Whinstanes.
						Per Cent.	Per Cent.	Per Cent.
A	..	..	..	..	..	22.7	5.3	35.9
B	..	..	..	..	..	37.0	19.4	50.43
C	..	..	..	..	..	21.7	74.2	9.4
D	..	..	..	..	..	8.8	1.0	1.7
E	..	..	..	..	..	1.4	.1	.22
F	..	..	..	..	..	..	..	.08
Ratoon	..	..	..	..	..	8.4	..	1.4
Durango	..	..	..	..	..	..	..	.77
Sundries	..	..	..	..	..	..	..	.10
Total Weight Annual.	..	..	..	..	..	1,106,915lb.	..	1,937,104lb.
Ratoon	..	..	..	..	..	101,840lb.	..	27,545lb.
Durango	..	..	..	..	..	..	..	14,683lb.
*Thursday Island	..	..	..	..	..	..	..	..
Total	..	..	..	..	..	1,218,755lb.	548,630lb.	1,969,882lb.

* Thursday Island cotton, 750 pounds, ginned at Melbourne.

SEASON 1923-1924.

The importance of grading was appreciated after the results of the previous year's work, and steps were taken to secure the services of a cotton classifier from England, who arrived in September, 1923. The seed cotton standards formed in the previous year were revised and important additions were introduced. A staff of men were appointed and taught the principles of grading seed cotton, and by the beginning of the season they were proficient and capable of grading seed cotton according to the revised standards. The most important revisions on last season's standards were the tightening up of the top grades of A, B, and C, whereby these three grades of seed cotton were limited to cover three grades of lint cotton instead of the five grades covered in the last season. This meant that A grade seed cotton should produce lint cotton of the grade of Middling Fair, B grade—Strict Good Middling, and C grade—Good Middling. The lower grades of seed cotton were not so restricted in their quality and were of a sufficient range to cover two grades of lint cotton. This meant that in order to cover the whole range of lint grades an extra grade of seed cotton would have to be established to include the lowest lint grades. This new grade was called G. The main reasons for the tightening up of the top three grades was to endeavour to produce as many bales of top grade lint cotton as possible. The premiums obtainable for high grade cotton on the overseas market were very good, owing to the scarcity of this class of cotton in the American crop.

It will be readily understood that it is necessary, in order to produce the highest lint grade of Middling Fair, that the seed cotton has to be of the very cleanest and brightest nature, and must be ginned separately from any seed cotton of a lower quality. As an example: if there are three wool packs of seed cotton of sufficient weight to make a bale of lint, two of which contain seed cotton of a grade which will gin out Strict Good Middling and the other contains seed cotton of a grade which would gin out Middling Fair, a blending of the cotton in the three packs

would probably produce a lint cotton which would be classed as a Strict Good Middling. The premium realised would be in accordance with values ruling for cotton of that grade, and the extra premium or value obtainable for the grade of Middling Fair represented by the seed cotton in the one wool pack would be forfeited. The best way to assure this premium is by segregating and ginning that class of seed cotton entirely on its own and not blending it in with cotton of a lower grade. The same system of grading applied equally to the B and C grades.

In addition to these revisions three grades were formed for immature cottons. The examination of many consignments of seed cotton from the previous year's crop revealed the presence of varying amounts of immature locks of cotton, which



PLATE 125.—STANDARD GRADE OF GOOD MIDDLING.

were in the majority of cases stained a light brown colour, and in all cases this type of cotton was very wasty and tender. The lint produced was also spotted and wasty. For these reasons it was deemed advisable to segregate consignments of this nature and gin them separately, not mixing them with mature cottons, as had been done in previous years. Three grades were formed to accommodate these cottons and were marked 1X, 2X, and 3X.

The 1X grade of seed cotton contained an amount of immature locks, causing the lint to be lightly spotted or wasty to a degree that would lower its value from that of a sound cotton; the amount of trash contained to be no greater than that contained in a C grade. The grade of lint produced would be approximately Good Middling Spotted.

The 2X grade was comprised of seed cotton containing immature locks, causing the lint cotton to be badly spotted or very wasty, together with the amount of trash that was admissible in the C or D grades. The lint cotton produced by seed cotton of this type would vary from a Strict Middling Spotted to a Middling Spotted grade.

The 3X comprised seed cottons containing a very large percentage of immature locks, causing the resultant lint to be of a tinged or stained class of cotton of the grade of Middling or below, and alternatively if such cotton also contained a large amount of trash, the cotton would be of an off-coloured Strict Good Ordinary grade or thereabouts.

The ban on ratoon cotton was lifted during this season and the grower was allowed to forward this class of cotton providing he abided by certain conditions. This seed cotton was not graded, and an advance of 3d. per lb. was paid to the grower. The bulk of this cotton was of a very short staple length and generally harsh in character and very uneven.

The seed cotton of the Durango variety was received at the Gladstone ginnery, where special arrangements had been made to keep the seed pure. All Durango seed cotton in addition to being graded was also classed for length of staple, and was segregated into four different classes of staple length, which were as follows:—

Class 1 cotton of $1\frac{1}{8}$ inch staple; Class 2 cotton of $1\frac{1}{2}$ inch staple;

Class 3 cotton of $1\frac{3}{8}$ inch staple; Class 4 cotton of $1\frac{1}{4}$ inch staple.

The cotton on arrival at the ginnery was classed and branded with the grade and staple length such as A3 or B2, &c., and then each lot was ginned separately so that the quality of the cotton in the bales of lint would be uniform. The number of bales produced in this class of cotton were 257 against 36 bales in the previous season.

Grade percentages and total quantities of lint ginned at the various ginneries for season 1923-24:—

Grade.	Whinstanes.	Rock-hampton.	Gayndah.	Dalby.	Gladstone.	Gladstone (Durango).
	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per cent.
A	41.6	6.92	14.7	22.5	27.0	11.2
B	31.58	19.90	37.7	..	29.0	20.0
C	8.67	28.10	23.6	..	22.2	33.0
D	2.62	32.8	..	77.5	6.6	13.2
E .. ..	.92	3.06	..	..	2.2	4.9
F .. ..	.13	.14	..	..	..	.4
G .. ..	.05	..	..	..	..	..
1X	11.5	5.4	18.7	..	9.70	8.2
2X	2.23	3.00	5.3	..	3.0	9.1
3X .. ..	.16	.40	..	..	.3	..
Ratoon ..	.54	.28	..	..	..	..
Total Lint lb. Production	2,497,432	1,760,146	229,369	1,797	129,653	121,860

SEASON 1924-1925

The system of grading that was introduced in 1923-1924 was adhered to without any revisions. The Durango type of seed cotton was treated at Gladstone ginnery, and was classed for both grade and staple as practised during the previous season. The storage for seed cotton at this ginnery was very heavily taxed and there was considerable congestion, caused to a large extent by the treating of ordinary annual seed cotton, ratoon seed cotton, and the Durango at the one ginnery; each different growth had to be kept separate, and in turn had to be separated for grade, and the Durango seed cotton for both grade and staple.

It was expected that the bulk of the seed cotton produced in the coming season would be of the Durango variety, and this would mean that the seed cotton received at all the ginneries would have to be classed for grade and staple length; therefore, the opportunity was taken to give tuition to all the graders in the method of stapling the seed cotton. This was carried out at Gladstone ginnery during the receiving of the Durango seed cotton.

Ratoon cotton was accepted at all ginneries and was graded on the same principles as the other seed cotton, but was valued at a lesser price. This cotton was of course ginned separately.

The following tables give the percentages of grades produced, also staple lengths of the Durango cotton:—

Grade.	WHINSTANES.		ROCKHAMPTON.		GLADSTONE.	
	Annual.	Ratoon.	Annual.	Ratoon.	Annual.	Ratoon.
	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.
A	8.06	6.3	3.0	1.6	2.5	..
B	17.4	16.1	12.5	11.8	12.6	3.3
C	15.3	13.6	19.1	16.1	15.3	13.0
D	9.5	12.6	23.1	23.7	14.06	17.7
E	6.18	4.9	14.72	14.1	6.5	26.0
F	1.20	2.8	4.32	5.8	1.35	5.0
G .. ..	.13	.4	.46	1.7	.69	.9
1X	32.1	35.6	11.5	15.1	37.00	22.7
2X	9.0	7.7	9.8	9.1	10.00	11.4
3X .. ..	.93	..	1.5	1.0	..	..
Sundries ..	.20	..	..	..	..	..
Total weight lint cotton in lb. ..	2,245,922	206,746	1,945,421	253,608	148,604	41,653

DURANGO.

GRADES.										
Staple Lengths.	A.	B.	C.	D.	E.	F.	1X	2X	3X	Durango Ratoon Cotton. C Grade.
	%	%	%	%	%	%	%	All Staples.		
1 .. ..	.69	.33	.73	1.40	.79	.38	1.30	..	..	..
2	6.00	16.89	17.30	6.40	.23	.09	13.10	5.17	.36	..
3	7.10	9.50	4.30	.80	.36	..	6.30	..	..	..
4 .. ..	..	..	.2	..	..	..	.35	..	..	..

Total weight lint cotton, 869,807 lb.

2,255 lb.

SEASON 1925-1926.

During the 1924-25 season, when dealing with the increased production of Durango cotton at the Gladstone ginnery and the dual work of grading and stapling was done, it was apparent that the separate stacking of the different grades and staples of seed cotton before ginning was a costly matter, and also required a great deal of space. The storage room was greatly taxed and at times was very congested. Also, the more grades and staples there were the larger the numbers of "changeovers" in ginning were required, and coupled with these facts was the knowledge that, in the coming season, the majority of the cotton produced would be of the Durango variety, so that in the future the cotton would have to be classed for both grade and staple length at all the ginneries.

Taking these factors into consideration, it was decided to widen the classes of staple length and grade, thereby making it possible to diminish the number of classes. All the graders had now had some experience in the method of stapling seed cotton. This work is more intricate than grading and requires a greater amount of experience, so the enlarging of the range covered by each class would aid the grader, in that he would not have to differentiate by such close margins. It also allows for a variation of quality that occasionally occurs in the pack of seed cotton sent in by the farmer.

The seed cotton standards were now composed of seven grades, as follows:—Four grades of mature cottons (A, B, C, and D), and three grades of immature cottons (1X, 2X, 3X), and three classes of staple length.

The following table shows the range of lint grades and length of staple covered by each class:—

STAPLE LENGTH.			Grade.
Class 1. Up to and including 1 in.	Class 2. Full 1 in. and including 1½ in.	Class 3. Good 1½ in. and above.	
A1 ..	A2 ..	A3 ..	Top side Good Middling to Middling Fair
B1 ..	B2 ..	B3 ..	Middling to Good Middling
C1 ..	C2 ..	C3 ..	Strict Low Middling to Low Middling
D1 ..	D2 ..	D3 ..	Strict Good Ordinary to Good Ordinary
X1 ..	X2 ..	X3 ..	Good Middling Spot and above
XX1 ..	XX2 ..	XX3 ..	Middling to Strict Middling Spot
XXX1 ..	XXX2 ..	XXX3 ..	Stained cotton or off colour low grade

A description of the characteristics of these grades can be found in the article on the "Description of Present Seed Cotton Grades."

These grade and staple length classes were duly approved of, and instruction work in accordance with the revised standards was carried out during the off season. This system of grading and stapling has proved satisfactory. The range covered by each seed cotton grade is approximately 2½ lint grades. This is a wide variation, and it is necessary that the seed cotton is thoroughly blended before being ginned. If this is not done, there will most probably be a lack of uniformity in the quality of the individual bales, but by thorough blending this fault can be controlled to a great degree.

Under this system of classing the seed cotton it is impossible to guarantee that a run of bales from one grade of seed cotton will all be of equal lint grade or all of equal staple length, and in order to ascertain the correct class of each bale it is necessary to draw samples of lint cotton and have them classed.

The weights of lint cotton produced at the various ginneries and the percentages of grades and staples are as follows:—

Staple Class.	Grade.						
	A.	B.	C.	D.	1X	2X	3X

WHINSTANES.

	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
1	5.14	.07	.22	.15	1.34	.24	.03
2	32.0	2.10	.84	.14	15.0	2.2	.08
3	35.7	.35	..	..	4.4	..	..

Total weight, 1,409,202 lb.; special growths, 19,251 lb.; includes 11,722 lb. carry-over from previous season.

ROCKHAMPTON.

1	8.4	2.7	.46	.2	2.64	.08	..
2	28.2	5.4	.59	.04	11.0	.30	..
3	25.0	5.6	.49	..	8.0	.90	..

Total weight, 1,047,599 lb.

GLADSTONE.

1	1.36	1.04	.26	..	.34	.10	..
2	22.25	4.68	.25	..	4.33	.44	..
3	60.04	2.54	..	..	2.37	..	..

Total weight, 396,398 lb.; includes 1,394 lb. carry-over from previous season.

COTTON CLASSING.

By L. L. GUDGE, Chief Government Classifier.

The system by which cotton is sorted out according to quality is known as "classing," and this term embraces two separate functions; one is determining the grade, and the other the length of the staple. The term grade is used in denoting the colour, lustre, and the nature of preparation of the ginning, and also the amount of leaf trash, sand, or other foreign substances contained. The length of staple denotes the length of the cotton fibre, taking into consideration the character, which term embraces the strength, body, uniformity, and smoothness of the fibre. These qualities have an important bearing on the lint. By the classification of cotton it is possible to determine its comparative value, to facilitate the sorting of individual bales into even running lots of the same grade and staple, and to expedite trading by affording the purchaser means of buying cotton on description without the examination of actual or type samples. The utilisation of cotton in spinning depends largely on its class and in the manufacture of yarns or fabrics, for which all but a negligible portion of the world's cotton is used, cotton of certain definite qualities is ordinarily selected for certain kinds and qualities of goods. Spinners also require cotton that has been selected into uniform lots of both grade and staple.

The spinning value of cotton can be expressed to a certain extent in terms of grade and staple length. The longer staples and higher grades are, as a rule, necessary in the production of finer and stronger yarns and fabrics. The higher qualities are more valuable for these reasons. A high-grade cotton contains less waste than a low grade and does not require to go through a severe cleaning process. This cleaning process damages the yarn according to the amount of cleaning required, and if the lower grades are not cleaned the yarn is affected adversely according to the amount of trash. Moreover, the higher grades are of a brighter and better colour and give greater satisfaction in both the bleaching and dyeing process. Generally speaking, the longer staples cottons are required in manufacturing yarns of greater strength and higher "counts" or fine size. The term "count" is used in expressing the number of hanks of yarn that 1 lb. of lint cotton will produce in spinning. One hank is 840 yards in length, so it will be seen that a long staple cotton of fine size which will spin 70 to 80 counts per lb. is of a greater value than a short staple cotton that will spin only 20 to 30 counts.

Cause of Varying Grades and Staples.

The grade of cotton is governed to a large extent by the weather conditions in the period intervening between the opening of the bolls and the time of picking. Cotton which is picked with care while the leaves of the plant are still green and has matured under bright sunlight conditions should be comparatively free from leaf, and should also be of good bloom and lustre and bright colour. On the other hand, bolls which are left open in the field for a long period tend to lose their lustre and become dull in colour or even bluish. Wind storms will damage the open bolls by blowing them on to the ground and picking up soil, &c., or by bringing the bolls into contact with the dry brittle leaf. Low grades are produced, however, under favourable weather conditions by deferred or careless picking, or the exposure of cotton to excessive moisture before being ginned. When several pickings are made in the same field the grades will vary, as weather conditions may have altered between the times of the different pickings, and it usually happens that a considerable number of grades can be found in the crop of any one field.

The length of the cotton fibre is dependent on the quality and type of the seed planted, the character of the soil, the care and cultivation given to the growing crop, and the climatical conditions under which it matures.

As all these numerous grades and staples are found according to the different conditions, it will be realised that cotton classing is very essential in the operations which attend the movement of cotton from the farm to the mill.

THE UNIVERSAL STANDARDS.

The classifier of America-grown cotton is guided in his work by special standards which are known as the Universal Standards. It is only during the last three years that there has been one definite set of standards. Previous to the introduction and acceptance of these Universal Standards by the various Cotton Exchanges of the world, there were in operation several different sets of standards, differing in style and grade terms. The desirability of a uniform set of standards was appreciated by the majority of persons in the cotton trade, and the United States Department of Agriculture promulgated sets of Universal cotton standards in all grades, colours, and types of American Upland and American Pima cotton. These standards are officially recognised by the leading Cotton Exchanges and Spinners' Associations throughout the world. They are the accepted basis for all purchases and sales, arbitrations and valuations, and all matters that pertain to the grade

of a cotton. There are seven different sets of standards dealing with American Upland cotton, which is the type of cotton grown in Queensland. The most important set is that for white cotton. The bulk of the cotton grown is equal to one or other of the grades in this set, and it is the one that affects us most; the other sets of standards which we are interested in are those for the spotted cotton and yellow tinged. The following table shows the grades and standards of the various colours:—

GRADES AND COLOURS OF THE UNIVERSAL STANDARDS FOR AMERICAN UPLAND COTTON.

Standards for Grades of Upland White Cottons.	Blue Stained.	Grey.	Spotted.	Yellow Tinged.	Light Stain.	Yellow Stained.
1 or Middling Fair .. ..	..	..	..	..	..	..
2 or Strict Good Middling ..	..	..	..	2 S.G.M.	..	..
3 or Good Middling	3 G.M.	<i>3 G.M.</i>	<i>3 G.M.</i>	3 G.M.	<i>3 G.M.</i>	3 G.M.
4 or Strict Middling	4 S.M.	<i>4 S.M.</i>	<i>4 S.M.</i>	4 S.M.	<i>4 S.M.</i>	4 S.M.
5 or Middling .. ..	..	<i>5 M.</i>	<i>5 M.</i>	5 M.	<i>5 M.</i>	5 M.
6 or Strict Low Middling ..	..	..	<i>6 S.L.M.</i>	6 S.L.M.	..	..
7 or Low Middling .. ..	..	..	<i>7 L.M.</i>	7 L.M.	..	..
8 or Strict Good Ordinary ..	..	..	..	..	..	..
9 or Good Ordinary .. ..	..	..	..	..	..	..

NOTE.—Symbols in heavy type denote grades and colours for which practical forms of the official cotton standards are prepared. For the grades indicated by symbols in italics no practical forms are furnished. Grey cotton is between the White and the Blue Stained in colour, Spotted between the White and the Yellow Tinged, and Light Stained between Yellow Tinged and Yellow Stained.

The grades shown above the horizontal lines are deliverable on future contracts made in accordance with section 5 of the United States Cotton Futures Act. Those below the line are undeliverable on such contracts.

In addition to official grade standards there are standards representing the staple length of Upland cotton. The standards are prepared by the United States Department of Agriculture. These standards are not universal. Several efforts have been made to get European Exchanges to accept them as such, but the movement has always been contested, due mostly to the difficulties that arise in taking into consideration the character of the staple and the effect it has on arriving at the length, so that up to the present time these standards are not effective and are not taken into consideration in valuations or settling disputes and arbitrations.

The personal opinion and practical experience of the classifier is the deciding factor in arriving at the length of staple. The standards for staple length are made up in a practical form and cover the whole range of staple lengths that can be expected of the various types of American Upland cotton; they are expressed in inches and fraction of an inch as follows:—

$\frac{3}{4}$, $\frac{7}{8}$, $\frac{1}{16}$, 1, $1\frac{1}{32}$, $1\frac{1}{16}$, $1\frac{3}{32}$, $1\frac{1}{8}$, $1\frac{5}{32}$, $1\frac{7}{16}$, $1\frac{1}{2}$, $1\frac{9}{32}$, $1\frac{5}{16}$, $1\frac{11}{32}$, $1\frac{3}{8}$ and $1\frac{1}{2}$.

THE GRADING OF QUEENSLAND SEED COTTON.

The American Method.

The method of classing described refers to the cotton after it has been ginned, when it is known as lint cotton. The Universal Standards are comprised of lint cotton. In America the cotton is not graded as seed cotton before ginning, as farmers bring consignments to the ginners in sufficient quantities to make complete bale lots—roughly, 1,500 lb. of seed cotton. The uniform quality of the cotton in the individual bale is assured, as the seed cotton which the farmer brings in is generally from the same field and is composed of one or two pickings. The seed cotton is taken by suction right from the farmer's wagon through the ginning machines, and if there is a difference of quality existing in his load of cotton it is so thoroughly blended that the desired uniformity is accomplished.

Method in Queensland.

Here in Queensland, where production is on a smaller scale, warranting only a limited number of ginneries, and seed cotton is received in uneven quantities from in order to ensure this uniformity of quality in bales of lint cotton it was necessary widely varying areas, it is necessary to have to stack cotton before ginning; and to devise a system of grading the seed cotton. This system of grading has had the desired effect of producing uniformity of quality in the bales of lint; whereas prior to any system of grading there was dissatisfaction expressed by the overseas buyers of our cotton as to this lack of uniformity. Such bales of cotton are known by the trade and are called "mixed packed." The following is taken from regulation 6, section 5, under the United States Cotton Standards Act:—"If a sample drawn from one portion of a bale is lower in grade or shorter in length than one drawn from another portion of such bale except as otherwise provided in these regulations, the classification of the bale shall be that of the sample showing the lower grade or shorter length."

It will be seen therefore from the above regulation that the value obtainable for the high grade or long staple cotton is forfeited owing to it being mixed in with cotton of a lower grade or shorter staple.

The system of grading the seed cotton here in Queensland is as follows:—

The mature seed cottons are graded into four different grades, according to the amount of trash or other foreign substances contained. These grades are known as A, B, C, and D. They are standardised in order to produce certain lint grades, and in all they cover the range of grades contained in the Universal Standards for white or creamy cottons. In addition, there are three grades of immature or spotted cottons—namely, 1X, 2X, 3X. These grades are also standardised and cover the range of lint cottons contained in the "spotted" standards.

While this system ensures the uniformity of the grade of the cotton contained in the finished bale of lint or ginned cotton, it will not bring about the desired uniformity of the length of staple contained in the bale. The grade of a cotton is not in any way dependent on the length of staple, or *vice versa*; and as the length of staple varies considerably according to the conditions under which the cotton is grown, the type of seed planted, character of the soil, and also the cultivation of the crop, it will be recognised that a system of classing had to be adopted in order to ensure uniformity of the length of staple in the pack. For this purpose all seed cotton is classed for length of staple. There are three classes of staple length, and the length of fibre which is admissible into each class is as follows:—

Staple Class.	Range of Staple.
1	Up to and including cotton of 1 inch.
2	From a full 1 inch up to and including cotton of $1\frac{1}{8}$ inch.
3	From a good $1\frac{1}{8}$ inch up to and including cotton of $1\frac{1}{4}$ inch or longer cotton.

DESCRIPTION OF PRESENT SEED COTTON GRADES.

At the present time the Queensland seed cotton is graded into four mature and three immature grades, and each of these grades can come into any of the three classes of staple length according to their quality.

The mature grades of seed cotton are described as follows:—

- (A) grade comprises seed cotton of very good colour and bright, is fully matured, and can contain a small portion of leaf. Care should be taken to keep seed cotton of this character free from immature locks. The grades of lint cotton which can be produced from this grade are Middling Fair, Strict Good Middling, and Topside of Good Middling.
- (B) grade comprises seed cotton of fair to good colour, practically free from immature locks, and containing a fair amount of leaf. The range of lint cottons covered are Good Middling, Strict Middling, and Middling.
- (C) grade comprises seed cotton of dull colour, containing a large amount of leaf trash, &c., and small percentage of immature locks. The range of lint cottons covered are Strict Low Middling and Low Middling.
- (D) grade comprises seed cotton which is very dull, and containing an excessive amount of trash of varied description and a fair percentage of immature locks. The range of lint grades covered are Strict Good Ordinary and Good Ordinary.

The immature grades are as follows:—

First: Immature, grade X, comprises seed cotton containing trash down to the amount contained in a low side A grade; is of good lustre, with the addition of immature locks to the amount of, roughly, 15 per cent. The range of lint grades covered are a Good Middling Spotted.

Second: Immature, grade XX, comprises seed cotton containing equal trash and lustre as that of B grade with the addition of immature locks to the amount of, roughly, 25 to 30 per cent. The range of lint grades covered are Middling Spotted and Strict Middling Spotted.

Third: Immature, grade XXX, comprises seed cotton of a very inferior character, containing a very high percentage of immature locks, about 60 to 75 per cent., and also containing a large amount of trash. The lint grades covered are off coloured low grades, or Strict Low Middling to Low Middling Yellow Tinged.

METHOD OF CLASSING AND RECEIVING AT THE GINNERY.

On the arrival of seed cotton at the ginnery, each farmer's consignment is sorted out according to the advices received as to number of sacks or bales forwarded. Each container is then opened by the grader who takes out sufficient cotton to judge it for grade according to colour and amount of trash that it contains, &c. After the grade is decided, locks of seed cotton are tested for the length of staple, and when the length is arrived at, both the grade and length of staple are chalked on to the container—such as A3 or B2, as the case may be.

Each farmer's consignments are then weighed separately under the supervision of a Government check weigher, according to the grades of the various containers. The cotton is then wheeled into the storage shed and stacked in separate heaps according to the grade and staple. When ginning each different stack is dealt with separately. The containers are split open and the seed cotton is emptied out and blended before being carried to the ginning machines through a suction pipe.

NOTES FOR GROWERS.

It is essential that the pack of seed cotton arriving at the ginnery contains a uniform quality—that is, from the top to bottom of the container the quality of cotton should be the same.

A Common Fault.

A very common fault with a large number of the wool packs of seed cotton that arrived at the ginneries in previous seasons was that different layers in the same pack showed that cotton picked by different pickers, or picked at different times, was dumped straight into the wool pack on the farm without any attempt being made at blending. Containers packed in this manner are apt to suffer in the grading, as it is very likely that the grading will be based on the lower quality contained; moreover, the bale of lint will be irregular in quality. In order to ensure evenness of grades throughout the container, the following method of packing seed cotton is advisable. After the pickers' bags have been weighed, the seed cotton should be emptied on the barn floor or any other suitable place and the day's or week's picking, as the case may be, thoroughly blended, and then packed into sacks or wool packs ready for despatch to the ginnery. The farmer in doing this is assisting the work of the grading and the industry, and at the same time obtaining a grade more in accord with the value.

Immature and stained cotton should never be packed with mature clean high-grade cotton. Care has especially to be given to this during the first pickings, as it is at this time that immature bolls are likely to be in evidence.

Method for Improving Grade.

Very leafy or dirty cotton but otherwise mature, such as is likely to appear towards the end of the picking season, should also be packed separately.

Seed cotton which contains leaf or other foreign substances can be greatly improved in grade by many simple means on the farm. A good plan is to pass it over wire netting stretched out to form a table, and by shaking it thoroughly quite a percentage of leaf and dirt will fall through the wire mesh. There are other simple methods which the farmer will find very advantageous in raising the grade of his seed cotton and so getting a better price at the ginnery, and the industry will benefit by obtaining the higher premiums realised on the top grades of cotton.

Send Dry Cotton.

It is always better to allow cotton that has become wet or even damp to dry on the bush, but if for any reason this damp or wet cotton has to be picked, on no account should it be packed or despatched to the ginnery without being thoroughly dried. First, for the reason that this style of damp packed cotton opens up at the ginnery very much inferior and the resultant grade will be lower, and secondly, for the much more important reason that such cotton cannot be ginned efficiently. The effect of the revolving saws of the ginning machinery on damp or wet cotton causes the lint to be cut and the cotton is lowered in value. Different growths of cotton should by all means be kept separate, and on no account should standover, ratoon, or annual cotton be mixed together. There is no need to mark on the container what the growth is, and growers who mix annual and ratoon cotton in the same container are not assisting in producing the desired uniformity of quality.

Australian Spinning and Weaving Mills.

It is anticipated that in future the bulk of the cotton grown here will be utilised in Australia by spinning and weaving manufacturers. This secondary branch of the industry in Australia is destined to grow into a large and important factor and will be of immense value to the cotton growers of Australia. The growth of the manufacturing industry will be governed to some extent by the quality of the cloth produced and the cost of production. The manufacturers pay high premiums for the higher grades and longer staple qualities of cotton. These premiums are of considerable value—for instance, the grade of Middling Fair cotton is quoted at a premium of approximately 1½d. per lb. of lint cotton more than the grade of Middling. The different staple lengths also vary considerably in value, and cotton that is equal to a class 3 in staple length is worth 1½d. per lb. more than a cotton that is only of class 1 staple length. A cotton that combines these two features of Middling Fair grade and class 3 staple length is therefore worth and can be sold for 3d. per lb. more than cotton of Middling grade and class 1 staple length. This means a difference of £6 5s. for each bale of lint weighing 500 lb. Naturally, buyers who are called upon to pay these premiums for quality cotton expect the bales of lint to contain cotton of a uniform quality, in accordance with the premiums paid, otherwise dissatisfaction is caused and claims are made, and once it became known that a certain growth of cotton could not be relied upon to be of uniform pack, it would be found very difficult to obtain good premiums for the higher qualities. The more uniform the quality of the lint is throughout the bale so is it more economical to the spinner, and the quality of the yarn and fabric produced is higher. Therefore a higher return is assured to the manufacturer and a better cloth to the consumer.

An Essential Point.

These factors all bear out the necessity for the careful classing of the seed cotton. Under the existing conditions of handling the seed cotton here in Queensland, it is impossible to ensure the uniform quality of the contents of each bale unless the seed cotton is classed first. It is absolutely essential that the system of classing which has been devised should be rigidly maintained, and by these efforts build up a reputation for uniformity of pack and quality, which will mean a keener demand for our cotton, more competition amongst buyers, and a higher return to the producer.

THE JOURNAL WIDELY APPRECIATED.

The following appreciative reference to the Journal by a Nambour subscriber is typical of many received from different parts of the State in the course of the month:—

"In renewing my subscription I must thank you for all past issues and also express my appreciation of the Journal. I think it is just splendid and of great value to the farmer."

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF APRIL, IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALL DURING APRIL, 1927 AND 1926, FOR COMPARISON.

Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.		Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.	
	April.	No. of Years' Records.	April, 1927.	April, 1926.		April.	No. of Years' Records.	April, 1927.	April, 1926.
<i>North Coast.</i>					<i>South Coast—</i>				
Atherton ...	In.	In.	In.	In.	c o n t i n u e d :				
Cairns ...	4.31	26	5.98	2.17	Nambour ...	5.39	31	4.43	5.57
Cardwell ...	12.09	45	12.19	9.10	Nanango ...	1.76	45	2.59	1.66
Cooktown ...	9.49	53	4.13	3.0	R. ckhampton ...	2.24	40	2.03	0.80
Herberton ...	9.22	51	10.50	6.50	Woodford ...	4.09	40	4.63	3.47
Ingham ...	4.14	40	2.81	1.34	<i>Darling Downs.</i>				
Innisfail ...	8.46	35	5.55	1.82	Dalby ...	1.20	57	2.20	1.38
Mossman ...	21.22	46	13.56	13.76	Emu Vale ...	1.15	31	0.79	1.14
Townsville ...	9.66	14	7.23	3.96	Jimbour ...	1.19	39	1.87	0.91
	3.67	56	0.43	0.03	Mies ...	1.28	42	1.37	0.53
<i>Central Coast</i>					Stanthorpe ...	1.42	54	1.32	0.56
Ayr ...	2.72	40	0.10	0	Toowoomba ...	2.36	55	3.29	1.39
Bowen ...	2.83	56	0	0	Warwick ...	1.58	62	1.21	0.34
Charters Towers ...	1.68	43	0.62	0	<i>Maranoa.</i>				
Mackay ...	6.56	56	2.07	0.90	Roma ...	1.21	53	0.85	0.17
Proserpine ...	6.23	24	1.11	1.10	<i>State Farms, &c.</i>				
St. Lawrence ...	2.75	56	0.68	0.26	Bungewongorai ...	0.78	12	0.51	0.21
<i>South Coast.</i>					Gatton College ...	1.53	27	1.64	1.28
Biggenden ...	1.80	27	2.90	1.59	Gindie ...	1.14	27	0	0
Bundaberg ...	2.82	44	3.83	0.76	Ilrmitage ...	1.18	20	1.13	0.59
Brisbane ...	3.54	76	2.07	2.36	Kari ...	4.93	12	4.01	3.30
Childers ...	2.51	32	3.57	2.32	Sugar Experiment	5.16	29	2.11	1.12
Crohamhurst ...	5.78	35	5.27	6.17	Station, Mackay				
Eak ...	2.58	40	3.01	3.65	Warren ...	1.31	12	1.80	0.75
Gayndah ...	1.29	56	3.32	0.30					
Gympie ...	3.12	57	4.16	2.65					
Cabooture ...	3.91	40	3.64	4.26					
Kilkivan ...	2.00	48	2.32	0.52					
Maryborough ...	3.43	55	4.21	4.68					

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for April, this year, and for the same period of 1926, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND,

Divisional Meteorologist.

Readers are reminded that a cross in the prescribed square on the first page of this "Journal" is an indication that their Subscription—one shilling—for the current year is now due. The "Journal" is free to farmers and the shilling is merely to cover the cost of postage for twelve months. If your copy is marked with a cross please renew your registration now. Fill in the order form on another page of this issue and mail it immediately, with postage stamps or postal note for one shilling, to the Under Secretary, Department of Agriculture and Stock, Brisbane.

BREEDS OF PIGS.**THE LARGE BLACK.**

E. J. SHELTON, Instructor in Pig Raising.

Of the several breeds of pigs introduced into Australia during recent years from countries overseas and referred to in this series of articles on "Breeds of Pigs," either as new or comparatively new to Australia and to the Australians, we find the Large Black breed occupying a very prominent position though as yet it is quite a new breed to Queensland.

Other breeds in this category and of similar value in building up the industry here include the Gloucester Old Spot, or as it is more frequently referred to by breeders as the G.O.S., emanating from Gloucestershire and its environs in the British Isles, and the Large Yorkshire or Large White, one of a trio of British white breeds of which we already had one representative here in the Middle Yorkshire (or Middle White) firmly established and well and favourably known both here in the north as well as in the Southern States.

The other British breeds used here in Australia include the Berkshire (often erroneously referred to now as the "Improved" Berkshire), probably the most popular of all the breeds, and the Tamworth, a runner up in popular fame and a breed destined to occupy a much more important place in our agricultural affairs now that the breed value for crossbreeding purposes with the Berkshire and other breeds is so widely acknowledged and appreciated.

Of American breeds we have but two, the Poland-China and the Duroc-Jersey, both breeds in which many farmers are interested and both breeds of whom much more is expected now than in former years. There are, by the way, many more pure breeds of pigs in the British Isles and on the continent and in America, but of these we have no representatives here. Their historical record and their special features or advantages will be fully described and illustrated later.

The Large Black.

Undoubtedly the Large Black pig is one of the oldest breeds of pigs in the British Isles if not in the whole world, and although it has only been possessed of a breed society and herd book since the year 1899, its rise to fame has been rapid in the extreme owing to its very fine qualities as a dual-purpose animal. Just where the original foundation stock of the breed had their abode, or who the first improvers of the breed were, or who first took them up is a matter for the historian; certain it is the Large Black dates far back into early English history before it was the custom to keep accurate records of the various breeds or types of pigs.

Seemingly the great stronghold of the Large Blacks in those days was in Devon and Cornwall in the west of England, and in Essex and Suffolk in the eastern counties. It was not till the year 1899 that fanciers of this old world black breed got together and decided on incorporating the Large Black Pig Society and on fixing a definite standard of excellence and scale of points, and finally on publishing a herd book. The publicity given to the breed as a result of this initial organisation laid the foundation of the breed's distribution and success, a success which has made the Large Black breed a popular and profitable one wherever it has been introduced and given a fair and reasonable try out. Nowadays the breed is well set and of uniform type, a type appealing to many and attracting more and more attention as the years roll by.

Writing to the Large Black Pig Journal a year or two ago a prominent breeder and fancier of the type, in dealing with its early history, traces its breeding away back to the Old English Hog of the sixteenth and seventeenth centuries, and then on to the year 1807, which year he considered could for everyday purposes be taken as the year of origin of the modern Large Black breed.

In Australia the breed was, until a year or two ago, always referred to as the "British Large Black" or the "British Black," and is still referred to by a few of the old hands as the Devonshire breed or as the Devon. It is referred to also in the Australian Stud Pig Herd Book as the British Large Black. Parkinson, a prominent author of the early days, referred to them in a booklet published in 1810 in the following terms:—

"The Large Blacks are distinguished by their gigantic size; they are the largest of the kind I have ever seen and of as perfect a make as is possible in pigs; their heads are large with heavy long ears hanging down on each side of the face so that they can scarcely see their way."



Photograph by courtesy of Captain H. N. Callcott.]

PLATE 126 (Fig. 1).—LARGE BLACK SOW, "McHEATHER BEAUTY," WITH LITTER OF NINE WELL-DEVELOPED GROWTHY YOUNGSTERS.

The Large Black Sow is an ideal mother, with maternal instincts strongly developed and with a capacity for heavy milk production.



PLATE 127 (Fig. 2).—LARGE BLACK SOW, "McHEATHER BEAUTY," PHOTOGRAPHED PRIOR TO FARROWING.

Note the exceptionally well developed body, the deep capacious chest, the development of udders and teats, and the well set-up hindquarters, all evidences of capacity and prolificacy. An ideal farmer's sow.

Writing about twelve months ago the secretary of the Large Black Pig Society at 12 Hanover Square, London W1. (Mr. B. J. Roche), in referring to the popularity of the breed, says:—

“You will, of course, be aware that we in England are experiencing something in the nature of a revival in the pig industry as compared with the last two or three years. Prices for store stock are very much better than they were, and breeders are finding it difficult to meet orders. Although prices for pedigree stock are not high, the best are selling well. There is no end of a demand from all quarters of the British Isles for Large Black sows, both for pure breeding and for crossing with Large White boars; this cross would appear to be much in favour in England, and it certainly has the benediction of the bacon curers. The progeny of this cross have the necessary length and depth for bacon with the virtue of early maturity. One is constantly meeting breeders and feeders who pay fine tribute to the maternal qualities of the Large Black sow.”

Writing of the distribution of the breed Mr. Roche states that there would appear to be no reason why Large Blacks should not prove as useful in Australia as they have done in other parts of the world, notably in South Africa. It is a fact that Large Blacks strongly predominate in Africa and, according to the registrations contained in the herd books of the Pig Breeders' Society of the Union, the breed was twice as strong numerically in 1925 as any of the other pure breeds to be found in that part of the world.

Mr. Roche further states his opinion that British pig breeders see no reason whatever why the Large Black and crosses in which it is concerned should not do as well in Australia, and in Queensland in particular, as in the Old Country; there they consider the breed second to none in the matter of early maturity, for they regularly market baconers of the finest grade possible at five and a-half months. The success of the various crosses with the Large Black is, in their opinion, due in no small measure to the very fine maternal qualities of the sow; she is capable of producing big litters and of doing (or suckling) them well. Even bacon curers who are not entirely in love with Black pigs have admitted the value of the Large Black sow as a mother; they place so much importance on this point that they put it down as one of their reasons for including the Large Black in their list of “selected” breeds. Mr. Roche thinks the reason why Large Blacks have not boomed in Australia in recent years is that breeders here appear to be unaware of the progress which has been made in breed improvement in the British Isles. A few years ago—and this was unfortunately the experience here in Australia when the first importations were made many years ago—Large Blacks were bred and fed to erroneous size and quite naturally they were coarse. The process of refinement has, however, been going on since the establishment of the herd book in 1899, and nowadays we have in the Large Black a pig second to none for breeding and for early maturity.

Originally, of course, the Large Black was a somewhat cumbersome animal of great length, but nothing so symmetrical as it is to-day. Now, the breed produces a large amount of lean meat, its great length yielding a wealth of prime well-streaked bacon. At one time the breed was noted for size, not quality; to-day they possess not only size but quality, their early-maturing carcasses yielding a prime marketable pig, 160 to 190 lb. dead weight, light in shoulder, jowl, and offal, and showing a large proportion of flesh and a well-developed hindquarter and ham. It is also claimed for this breed that the sows having such length of body are able to carry large well-developed litters with comparative ease; the depth of body gives ample room for the development of the vital organs, the heart and lungs particularly, while the long deep sides and well-built up fore and hind quarters make for all that a bacon curer requires. A pig with plenty of length from pin-bones to tail invariably carries good hams, and where the tail is well set up and the loin broad there is ample room for the development of the ham—the most valuable portion of the carcass.

Other Qualities.

In the Large Black breed the head should be of medium length, wide between the eyes and ears, this indicative of a strong sturdy constitution and a wide and deep frame; the jowl must be of medium size, not too light or pinched, while the chest must be wide, deep, and capacious; a narrow cramped chest would not allow for the development of heart and lungs to the best advantage, and thus constitution would suffer; the shoulders should be fine, not too heavy in the shield in the case of males. A heavy coarse shoulder is undesirable from the bacon curer's point of view, as it is a cheap cut and one for which there is a lighter demand than for middles or hams.



Photo.:—Sport and General, London.]

PLATE 128 (Fig. 3).—A MODEL TYPE OF THE LARGE BLACK BREED.

This Sow, "McHeather Susan, II," 1923, won First Prize at the Royal Agricultural Society's Show in England in keen competition.



PLATE 129 (Fig. 4).—LARGE BLACK GILTS (YOUNG SOWS), AT THE STUD OF W. E. BARKER, ESQ., BENDIGO, VICTORIA.

Sturdy well-developed breeders of the very best type. Ideal sows for cross-breeding purposes for the production of medium bacon pigs.



PLATE 130 (Fig. 5).—LARGE BLACK SOW, "BENDIGO HELEN," No. 45, PROPERTY OF CAPTAIN H. N. CALLCOTT, OF THE WATTLE HERD, GIRGAREE, VICTORIA.

This sow is a noted prize winner at Sydney and Melbourne Shows. Her progeny have made a name for themselves also in the show ring. Note the development of ham and middle piece, and the well set-up tail of this sow.

A special feature of the Large Black is its long thin ears inclined well over the face with a nose of medium length. This carriage of the ears over the eyes induces a quietness of habit and docility quite characteristic of the breed. The legs and feet should be strong, short, and straight, with no sign of inbent knees or "cow" hocks.

Breeders of the Large Black claim that the breed is particularly resistant to disease and abnormal conditions, the young pigs at birth being vigorous and sturdy, well able to look after themselves and to battle for their living.

In colour the Large Black is distinctly black, no white, reddish, or greyish markings whatever being allowed. The breed is very hardy and is ideally adapted for the warmer climes of the North; they do not suffer from sunburn or sunscald, hence their adaptability for conditions on farms still in the early stages of development. The boars are particularly prepotent, stamping their type and quality on the progeny no matter what breed of sow the young pigs may have had as a mother. The sows are deep bodied, matronly, docile, and prolific, being heavy consistent milkers well able to rear a dozen good pigs or more per litter; the sows have particularly well developed udders and numerous well-shaped teats. The boars also show excellent development of embryo teats. This is a feature worthy of note; it is one often overlooked by pig breeders and judges. Stud cattle breeders always look for well developed and evenly placed teats both in female and male cattle, though, of course, the male teats do not fill up and develop as in the case of the female.

It is these powers of prolificacy and heavy milking capacity that give to the Large Black sow a value that can scarcely be claimed for any of the medium types shorter and more compact in body. It is at any rate a very great advantage to have breeding sows that are prolific and that produce large quantities of rich nourishing milk, for all too many sows nowadays lack these very necessary and important qualifications. It is a waste of time keeping a sow capable only of rearing litters of four and five, while sows of the larger breeds are available capable of producing twice as many suckers and feeding them well.

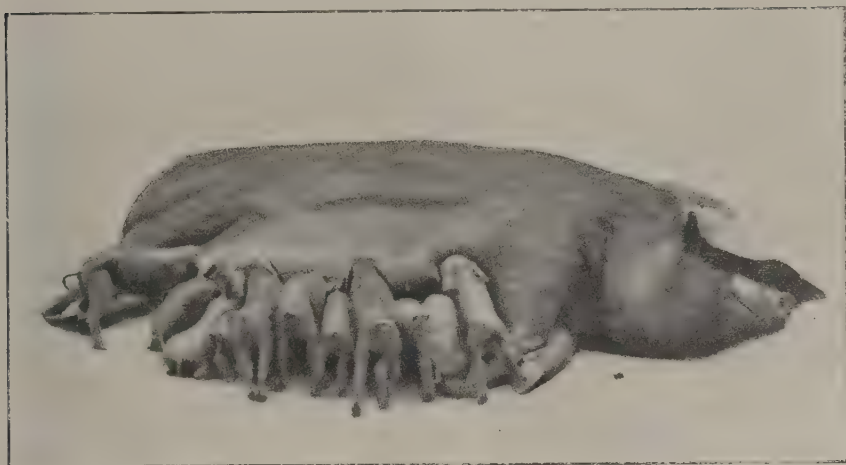
Instances of the Prolificacy of the Large Black Breed.

In a well-known British herd of Large Blacks four sows produced 53 pigs between them, one had 18 pigs, another 13, and two had 11 apiece. A Large Black boar was mated with ten sows and the result at farrowing time was 98 pigs; one sow in her first litter had 13 pigs. Eighty young pigs from eight sows is the experience of another breeder, while still another instance is recorded in which one Large Black sow had 38 pigs in four litters, of which she reared 34. Another in the same herd had 37 pigs in four litters and reared 34. As another authentic example a Large Black sow, four and a-half years old, farrowed a litter of 20 pigs; she had never farrowed less than 12 pigs, and her average litter was 16. At fifteen months old four other sows of this breed out of a famous prize-winning sow farrowed, one had 13 pigs, two had 11 each, and one had 10, all healthy, strong youngsters; altogether 45 pigs from four first litters. Yet another sow in four litters had 39 pigs, rearing 37 of them. It is further claimed that the Large Black sow not only produces large thrifty litters but is able and ready to rear them well.

The abovementioned records are taken from a pamphlet descriptive of the breed as issued by the Large Black Pig Society. Local instances of prolificacy are referred to in the following extract from a letter received from one of the leading breeders of this type in Victoria, Captain H. N. H. Calcott, of the "Wattle herd," Girgarre, Victoria. Captain Calcott writes:—

"With regard to the Large Black breed. I have bred these pigs for a considerable number of years and can vouch for the following qualities:—Firstly, they are very quiet, being exceptionally docile, and the sows make excellent mothers. Secondly, they are quick maturing. These pigs with proper feeding can attain a weight of 140 lb. dressed in five months. Pigs fattened by me in England attained a weight of 227 lb. (dead weight) at seven months and seventeen days of age, and a fat sow went 427 lb. (dead weight) at twelve months of age.

"The Large Black is an excellent bacon pig which has all the qualities required by the curer—i.e., light head, light shoulders, great length and depth, well sprung ribs, and good hams. The pigs are good graziers. They can stand any extremes of climate and thrive under adverse conditions. Our litters are kept on their mothers till they are three months old, and the average weight of the piglets at this age is 55 lb. sows and 60 lb. boars. The boars are large litter getters. Three sows farrowed recently here at Girgarre producing 13, 13, 10, which average 12. One sow had a litter of 22, but this, of course, is exceptional, the average in a herd working out at 12 piglets. As you probably know I fattened two hogs of



Copyright Photo, by Walter Burke, Sydney.]

PLATE 131 (Fig. 6).—LARGE BLACK SOW, "BRENT GRACE," No. 4540 (IMPORTED).
A TYPICAL MATRON.

She farrowed 47 pigs in three litters, and was the property of Mr. Herbert Garratt whose stud at Randwick, now dispersed, was for many years a centre of activity in the distribution of pigs in this breed.



Copyright Photo, by Walter Burke, Sydney.]

PLATE 132 (Fig. 7).—WAITING FOR THE BREAKFAST BELL. A TYPICAL
LARGE BLACK SOW.

Note character of head and shape and size of ears, and the way they fall over the face and eyes. Characteristic features of the Large Black are docility, prolificacy, contentment, and quick growth.

this breed for the Melbourne Royal Show. These pigs were farrowed on 25th February, 1926, were weaned on 25th May, when they averaged 42 lb. each; they were then brought in and fed. On 12th July, 1926, they were weighed and averaged 142 lb. each live weight, and on 18th August, 1926, were weighed again and then averaged 221 lb. live weight, and were not able to be sent to the show on account of overweight. They therefore averaged 221 lb. live weight at five months and three weeks old. Taking into account that the bacon pigs in Queensland are desired to be of a lighter weight, the weights required could be comfortably acquired in five months."

Captain Calcott states that it may interest readers to know that the Large Black Pig Society is the largest single pig society in the world, the number of registered Large Black pigs in England being greater than any other breed.

Queensland breeders of Large Blacks are at present very limited in number as this breed has not yet been introduced except by the two breeders, Mr. Geo. F. Davison, of North Arm, who has one boar and sow and a number of young pigs, and Mr. F. Muston, of Taabinga road, *via* Kingaroy, who has a Large Black sow. In each of these cases the breeding stock were secured from Captain Calcott's herd, Mr. Davison's pigs being the property of his son George, a member of one of the pig clubs to whom Captain Calcott had donated a Large Black boar.

Local experience therefore of the modern Large Black is practically nil. Mr. Davison's sow farrowed a first litter of nine a few days after arrival from Victoria and reared the lot, a tribute to her quality considering she had a long rail journey and sea trip during the period she was carrying her litter.

We do not, of course, recommend the use of the Large Black breed pure except for stud or for cross-breeding purposes, as our markets call for comparatively light and prime bacon pigs not exceeding 175 lb. live weight or thereabouts at approximately five and a-half to six months of age. Crosses of the Large Black with the Berkshire, Poland-China, and Middle Yorkshire are recommended, though whether these crosses with us here in Queensland will prove more adaptable or even as suitable as, say, the Berkshire-Tamworth cross, remains to be seen.

Breeders interested are urged to write for a list of names of breeders and for further information to the Instructor in Pig Raising, Department of Agriculture and Stock, Brisbane, Q.

The Standard of Excellence for Large Blacks.

The Council of the Australian Stud Pig Breeders' Society have adopted the following "Standard of Excellence" for British Large Black pigs, the breed referred to in this article:—

Head—Medium length, and wide between the ears.

Ears—Long, thin, and inclined well over face.

Jowl—Medium size.

Neck—Fairly long and muscular.

Chest—Wide and deep.

Shoulder—Oblique and narrow plate.

Back—Long and level (rising a little to the centre of the back not objected to).

Sides—Very deep.

Ribs—Well sprung.

Loin—Broad.

Quarters—Long, wide, and not drooping.

Hams—Large and well filled to hocks.

Tail—Set on high, not coarse.

Legs—Short and straight.

Belly and Flank—Thick and well filled.

Skin—Fine and soft.

Coat—Moderate quantity of straight, silky hair.

Objections.

Head—Narrow forehead or dished nose.

Ears—Thick, coarse, or pricked.

Coat—Coarse and curly, bristly mane.

Colour—Any other than black.

STOCK JUDGING.—HINTS TO YOUNG COMPETITORS.

The following hints for competitors in the "Young Judges' Competitions" at agricultural shows have been compiled by Mr. E. J. Shelton, H.D.A., Instructor in Pig Raising, and are likely to be of use, not only to those for whom they are specially designed, but to all breeders when selecting their stud stock:—

1. Be confident. Judges of any class of stock or product must know their business; they must have a clear conception of the standard of excellence aimed at, and a knowledge of the comparative value of each point on which the animal or product is judged.

Remember: The world makes way for the man that knows—the man that knows he knows.

2. Knowledge of your business inspires confidence. Young judges should not be afraid to ask questions on matters about which they are not quite certain.

3. Study the animal or the object you are to judge, and compare its respective points alongside those referred to in the standard of excellence.

4. Practise judging and watch other judges at work as opportunity offers.

5. Study the list of disqualifications or objections to which reference is made in all standards of excellence. Judging is largely a matter of discovering faults or imperfections, and of comparing the seriousness of these faults with the increased value allowed for perfection. Some imperfections develop into disqualifications, some have hereditary tendencies, and tend to reduce the commercial value of the animal or product, some are of a less serious nature, and are not likely to influence the animal's value for show or stud purposes, but it is the animal whose scale of points approaches perfection that realises the highest value, and for which there will be keenest competition if offered for sale.

6. Be careful in filling in your judging cards, judges' book, &c., and be accurate with your figures.

7. Young judges should be prompt in attendance at judging contests, and if unsuccessful in gaining the coveted awards, be a good loser and come up smiling again next time.

8. Carefully note the following:—In judging and selecting pigs, the following points should be specially noted:—

(a) Constitution, as noted by general healthy appearance of animal, the quality of its skin and hair, the width between the eyes and ears, the width and depth of chest and body, the strength of the legs and feet, and by the animal's vigor.

(b) Pedigree.—For stud purposes, it is essential that the animal's pedigree should indicate careful breeding, that the parent stock were of reliable, vigorous, and unrelated strains, and that, in the case of a sire, he be unrelated to the dams to whom he is to be mated.

(c) Type and quality.—Type is important, as indicating the result of careful selection of the parent stock; quality counts for much in the commercial world; quality stock always realise top prices; they pay handsome dividends.

(d) Temperament.—Contentment and docility indicate the temperament of the animal. Note the appearance of the eye; a white streak in the eye is regarded as a sign of bad temper.

9. Value your animal. A judge is quite within his rights in asking the approximate value of an animal or its products. Practical experience and knowledge of commerce of the animal are invaluable.

Further details may be had on perusal of the pamphlet "Young Judges' Competitions," available gratis on application to the Department of Agriculture and Stock, Brisbane, Queensland!

THE FARMER WHO DESERVES TO BE POOR!

Thus a Yarwun subscriber (15th May, 1927):—“Any farmer who cannot be bothered to get and read the ‘Queensland Agricultural Journal’ deserves to be poor all his life.”

THE AIM OF HERD TESTING.

The opinion is held by many dairy farmers that testing as at present carried out does not give a true record of a cow's capacity to produce butter-fat, because under normal conditions very few cows produce as much as they could produce if they received all the food they needed. The truth of this must be generally conceded. But no dairy farmer is very hopeful that his cows will get all the food they can consume every day right throughout the year. The advocate of herd testing does not attach any importance to this phase of the question; the chief aim of herd testing is not to record abnormal results.

The advantages of the herd-testing work are briefly as follows:—

1. It individualises each cow, and is the only method of estimating the producing ability of each member of the herd.
2. It tests systems of feeding for milk production.
3. It tests the herd sire through the production of his daughters.
4. It creates higher values for proved cows and their progeny.
5. It shows positively that some system of milk recording and testing is essential to progress.
6. It will direct attention to loss through faulty separating. During last year a dairyman with a large herd discovered a loss of 15s. a day by the herd tester chancing to test the skim milk.
7. Herd-testing Association meetings can be utilised as a means of bringing district dairymen together, when local and general problems can be discussed.

EGG-LAYING COMPETITION.

WORLD'S RECORDS BROKEN IN TOOWOOMBA TEST.

The final results for the single bird were won by Mr. R. Burns, of Warwick, 132 Black Orpington, who finished with 354 eggs in 365 days.

This record exceeds the previous record of 347 $2\frac{1}{2}$ oz. eggs which was laid in the Government test held at Gatton in 1923 and won by the same owner, Mr. R. Burns. No. 132 won the winter test for the heavy section by laying 90 eggs in 92 days, her highest sequence during the test being 165, which she commenced on the 4th of July and finished on the 15th of December. Her weight on entering the test being 5 lb., and on completing the record she turned the scales at 7 lb., and still holding good in feather. At the official weighing of eggs (30th July) her eggs averaged 2.10 oz., and at the termination of her record the eggs weighed 2.25 oz.



PLATE 133.—S. V. B. SHARKEY'S TEAM OF WHITE LEGHORNS.

Team of Three Birds.

The White Leghorn Team No. 28, 29, and 30, won by Mr. S. B. V. Sharkey, of Toowoomba, also created a very fine score, if not a world record also by laying 923 eggs in 360 days; this score exceeds the New Zealand record by 2 eggs and 5 days less for each bird. No. 30 won the winter test for light section with 88, and No. 28 second with 85 eggs. The individual score for each of the birds together with their respective weight of eggs are:—No. 28: 315 2.40 oz. eggs. No. 30: 308 2.06 oz. eggs. No. 29: 300 2.25 oz. eggs.

This team won three silver cups and several of the cash prizes. It is regretted that the committee was unable to test this team out to the full 365 days owing to the entrance of the new birds for the forthcoming test, as they would have added a few more eggs to their very fine record.

SINGLE TEST EGG-LAYING COMPETITION.

Conducted at Toowoomba.

From 1st April, 1926, to 31st March, 1927. Variety, Black Orpington; 1st type; pen number, 132; weight of bird, 5lb; weight of eggs, 2.10oz. on 30th July, 1926; owner, R. Burns.

Day of Month.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
1 ..	1	1	1	1	1	1	1	1	1	1	1	1
2 ..	1	1	1	1	1	1	1	1	1	1	1	1
3 ..	1	1	1	0	1	1	1	1	1	1	1	1
4 ..	1	1	0	1	1	1	1	1	1	1	1	0
5 ..	1	1	1	1	1	1	1	1	1	1	1	0
6 ..	0	1	1	1	1	1	1	1	1	1	1	1
7 ..	1	1	1	1	1	1	1	1	1	1	1	1
8 ..	1	1	1	1	1	1	1	1	1	0	1	1
9 ..	1	1	1	1	1	1	1	1	1	0	1	1
10 ..	1	1	1	1	1	1	1	1	1	1	1	1
11 ..	1	1	1	1	1	1	1	1	1	1	1	1
12 ..	1	1	1	1	1	1	1	1	1	1	0	1
13 ..	1	1	1	1	1	1	1	1	1	1	1	1
14 ..	1	1	1	1	1	1	1	1	1	1	1	1
15 ..	1	1	1	1	1	1	1	1	1	1	1	1
16 ..	0	1	1	1	1	1	1	1	0	1	1	1
17 ..	1	1	1	1	1	1	1	1	1	1	1	1
18 ..	1	1	1	1	1	1	1	1	1	1	1	1
19 ..	1	1	1	1	1	1	1	1	1	1	1	1
20 ..	1	1	1	1	1	1	1	1	1	1	1	1
21 ..	1	1	1	1	1	1	1	1	1	1	1	1
22 ..	1	1	1	1	1	1	1	1	1	1	1	1
23 ..	1	1	1	1	1	1	1	1	1	1	1	1
24 ..	0	1	1	1	1	1	1	1	1	1	1	1
25 ..	1	1	1	1	1	1	1	1	1	1	1	1
26 ..	1	1	1	1	1	1	1	1	1	1	1	1
27 ..	1	1	1	1	1	1	1	1	1	1	1	1
28 ..	1	1	1	1	1	1	1	1	1	1	1	1
29 ..	1	1	1	1	1	1	1	1	1	1	..	1
30 ..	1	1	1	1	1	1	1	1	1	1	..	1
31 ..	..	1	..	1	1	..	1	..	1	1	..	1
Total for Month ..	27	31	29	30	31	30	31	30	30	29	27	29
Total to Date	27	58	87	117	148	178	209	239	269	298	325	354
Average per Month ..	27	29	29	29.2	29.6	29.6	29.8	29.8	29.9	29.8	29.5	29.5

Remarks.—Highest sequence during test from 4th July to 15th December equalled 165 eggs. Winner Winter Test (May, June, and July), 90 eggs; also highest score for single bird over all breeds in Test. The weight of the final egg being 2.25oz. Weight of bird at finish, 7lb. I certify that the above figures are correct—J. C. Kables, Supervisor.

H. CUTCLIFFE, Hon. Secretary,
Darling Downs Poultry Breeders' Association, Toowoomba.

INCUBATION.

By P. RUMBALL, Poultry Instructor.

SEASON TO INCUBATE.

This is perhaps the first phase that should be considered. Although incubation may be successfully practised throughout the year, the results obtained from the birds hatched is not always satisfactory. About the best months for hatching are July, August, and September. Heavy breeds hatched in June and light breeds in the early part of October will in some people's hands prove satisfactory. Chickens of any variety hatched in February or early March also thrive, but unfortunately they commence producing during the period of plenty and generally moult at about the same time as birds which have done twelve months heavy lay.

The frequent fault of poultry raisers is to hatch in the latter part of October and sometimes November. Stock hatched then rarely thrive, and also take longer to mature than early hatched birds, with the result that their production period commences with the fall in prices of eggs.

Selecting Eggs for Hatching.

Care in the selection of eggs which are to produce the future layers should be exercised. They need to be selected for (a) size, (b) shape, (c) texture of shell, and (d) colour.

Although like does not produce like with any degree of certainty, constant selection along these lines tends to fix the qualities aimed at. Size is undoubtedly an inherited quality and one of the features which has an important bearing on successful poultry raising. Breeding birds should be selected early in life for size of egg, as it is only by this means that a strain of fowls can be built up which will lay a good marketable egg early in their pullet year. Do not be content with just using 2-oz. eggs. Aim at eggs which will average about 26 oz. to the dozen. Although shape does not materially affect the value of eggs, a uniform article is desired for marketing. Shape, however, has a certain influence on successful incubation. With incubators, as a general rule, the higher the tray or eggs the greater the heat, therefore if some plump eggs are set at the same time as rather long thin ones the hatching would be irregular owing to the greater heat received by the roundish eggs, they being higher on the tray. Texture of shell varies considerably with the feeding and general conditions of the stock, but it is also possible for this feature to be hereditary. Apart from this, uniform shell structure makes for improved hatches. Colour is not an important feature in Queensland in regard to sales, but from light breeds white-shelled eggs should be produced, tinted eggs being an indication of impurity of breed.

Keeping Eggs for Hatching.

Eggs for hatching purposes should not be kept for a longer period than ten days. If they were set when five days old better results could be expected than when ten days old. It is however, necessary to keep them sometimes longer than five days and sometimes even longer than ten, therefore they need to be kept under the best of conditions. A uniform cool temperature is desirable, slightly under 60 degrees if possible. The room where they are stored should be dry and not moist. Although fresh air is desirable, direct currents with their drying effect are detrimental to good results. They may be stored on racks or in straw board filters. Where any numbers are to be kept they could be held in egg cases similar to those used for market purposes. The turning of them daily is essential when they are to be retained for any time. This is a simple matter if stored in cases, it being merely necessary to turn the case one side one day and the other the next.

Period of Incubation.—Hen eggs 21 days, English ducks 28, Muscovy ducks 34 to 35, geese 28 to 30, and turkey 30.

METHODS OF INCUBATION.

Incubation may be practised either by natural or artificial means. The necessity of having birds hatched at the most remunerative period and the constant improvement in our commercial breeds of poultry makes it increasingly difficult for the poultry raiser who desired to keep a 100 or so good laying hens to use the broody hen.

Natural Incubation.

The Sitting Hen.—Generally, when the hen is used for incubation she finds her own nest. The best plan is to allow her to continue using it, merely protecting her from rough weather. Her eggs, however, should be removed and replaced with eggs which come from the best of your stock. As she is expected to remain on the nest for a period of three weeks and will not make full use of dust baths, she should have a good dusting with some insect powder to destroy any lice. She should also have another dusting a few days before the chickens are due.

Red mite are possibly one of the most common and irritating parasites which trouble poultry. They multiply very rapidly when unchecked, and a sharp lookout should be kept for their presence, for if allowed to infest a broody hen the irritation will often cause her to leave her nest. Scaly leg is also a condition which is undesirable in the broody hen. The number of eggs to be used will naturally vary according to the size of the hen. The hen turns the eggs under her at frequent intervals, and when there are too many for her to cover properly those that get on to the outside of the nest will become chilled, resulting in the destruction of the embryo. The hen should be fed exclusively on a grain ration and have plenty of grit and water available. The best results will then be obtained by leaving her as much as possible to herself after giving attention to the foregoing particulars.

Artificial Incubation.

There are many reliable makes of incubators on the market which are sold with instructions for working. These instructions should be followed by the operator as they are prepared after tests made by the manufacturer. There are, however, features which apply in a general way to most makes.

Location of an Incubator.

The incubator should be set up in a room in which there is as little variation in temperatures as possible. If a special room is to be built it should have two roofs with a space of 5 inches or 6 inches between them. The outer overhanging several feet on all sides. This is better than a good ceiling as it allows of a constant current of air and at the same time keeps the direct rays of the sun off the walls. Ventilation should be provided by windows in the walls and vents in the inner roof. These can be operated according to the number of machines working in the room and the outside temperatures. Direct drafts, however, should be avoided. Where it is not desired to go to the expense of building a special incubator room, an enclosure can be made under the majority of the dwelling houses in Queensland. If it is situated under the centre of the house it is well protected from the sun, and the temperatures are therefore fairly uniform.

Heating of Incubator.

The majority of incubators are heated by kerosene lamps. The lamp should always be thoroughly cleaned, the burner boiled in soda water, and new wicks used for every hatch. In starting do so gradually. If a large flame is used for a start with the idea of heating the machine quickly it frequently leads to the smoking of the lamp. A good grade oil should always be used, and in adjusting the flame turn a little higher than required and then reduce to the desired height. This ensures that there will be no running up of the wick.

The lamp should be cleaned and filled early in the afternoon. By doing this all char of the wick is removed, giving greater heat during the cold night and at the same time it gives the operator the opportunity of making sure that the lamps are correctly adjusted before retiring for the night. Do not trim the wick with scissors, use a match to rub off the charred crust, and thoroughly clean the hands before handling eggs, otherwise the eggs may become smeared with oil with the resulting injury to the growing embryo.

Beginning the Hatch.

Heat up the machine a couple of days before it is desired to set eggs, and after the machine is thoroughly warmed up commence to adjust the regulator until the temperature remains steadily at 102 degrees Fahr. with the bulb of the thermometer on a level with the top of the eggs. When the operator is sure that the regulator is correct the eggs can be set. This is better done in the morning so that the eggs will become warm and the machine again regulated before retiring. When the eggs are placed in the machine the temperature will drop, but the regulator should not be interfered with. All subsequent regulation should be done by the adjustment of the flame. Do not place too much work on any system of regulations; it has its limit of capacity to adjust temperature.

Thermometers.

All thermometers should be tested at convenient intervals. This can be done by any person having a clinical thermometer by placing the clinical and incubator thermometers in a basin of warm water gradually increasing the temperature until the clinical thermometer registers 102 degrees and observe the temperature of the incubator thermometer. If the latter registers a degree or so either way, allowance should be made by the operator for this discrepancy. Incorrect thermometers have been responsible for many poor hatches, and even though a new machine is just purchased do not take it for granted that the thermometers supplied are correct.

Temperature.

Temperatures are controlled by capsules or thermostat. Occasionally these get out of order by the former leaking and losing some of the liquid content or by the latter becoming bent. These should be examined particularly when regular temperatures cannot be maintained to ascertain if they are in correct working order. The temperature should stand at 102 to 102½ during the hatch when the bulb of the thermometer is hung as previously stated. During the latter period of the hatch (the last two days) the temperature may run up to as high as a 104 degrees. This need not worry the operator as it is caused by the additional animal heat from the live embryo.

Turning.

Begin turning the eggs at about forty-eight hours after setting, and continue to do so twice per day until the nineteenth day unless the eggs are starting to pip. When the eggs are placed in an incubator tray, they should be placed on an angle of about 45 degrees large end up. To turn these it is necessary to handle every individual egg, but after testing and the infertile eggs are removed, they can easily be gently rolled around with the hand. A complete turn is not necessary, it being sufficient only to alter the position of the egg to prevent the germ sticking to the inner lining of the shell.

Cooling.

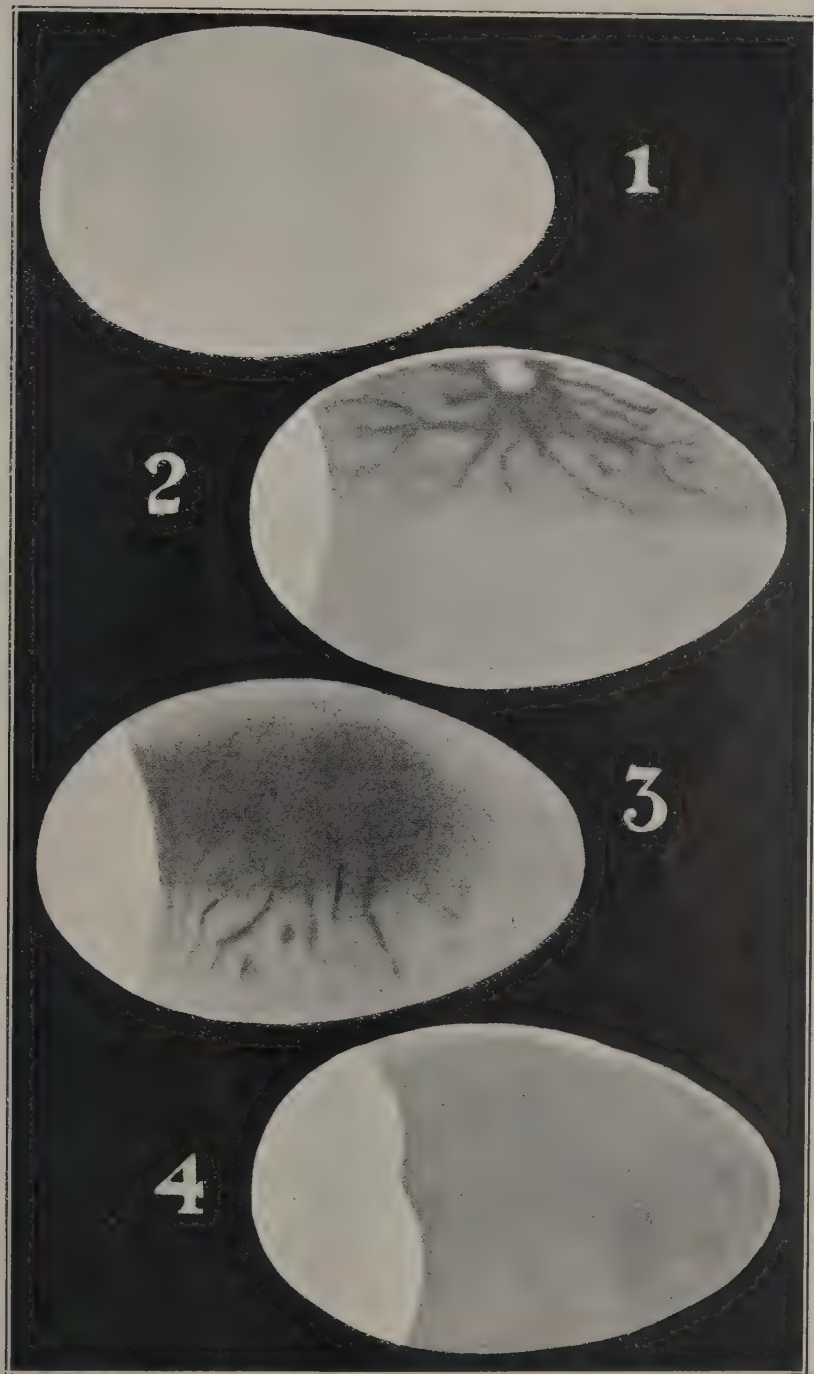
The cooling of the eggs is merely another method of giving the eggs a thorough airing with the consequent strengthening of the embryo. The necessity of airing varies with the make of the machine owing to the variation in the supply of ventilation. It is, however, important to remember that for the first seven days very little airing is required. The time taken in turning the eggs from the third to seventh day is usually enough airing. After this period the eggs can be kept out of the machine until all burning heat has left them. The period necessary will vary according to the length of time the eggs have been in the incubator, but after returning the eggs to the machine the temperature should have reached the desired height within an hour. In airing, place the tray of eggs on a table. Do not allow a portion of the tray to overhang, otherwise some may become chilled owing to the greater circulation of air. Airing should be practised up until the nineteenth day, but if eggs are then chipping they should not be aired.

Testing.

This should be done on the seventh day. It can be done at an earlier stage but the time necessary to do this work may result in chilling, and also the germ is not so easily distinguished particularly in dark-shelled eggs as on the seventh day. All infertile eggs and dead germs can now be removed. To test, a piece of cardboard having a hole in it similar in shape to that of an egg but a trifle smaller should be held between a lamp and the egg to be tested. An infertile egg will be perfectly clear, a fertile egg will have a dark movable spot about the size of the head of a match with numerous blood vessels radiating from it, while a dead germ will show as a blood ring or streak and generally stationary.

Ventilation and Moisture.

These are both interlocked. If a machine has a rapid circulation of air through it, it will require more moisture than a machine in which the circulation of air is slow. The reason why moisture is supplied is to prevent a too rapid evaporation of the moisture content of the egg. Undue evaporation of the egg content is detrimental to good hatches and to correct development of the embryo. Enlargement of the air cell naturally takes place due to evaporation of the moisture content and the escape of carbon dioxide through the shell. This enlargement can easily be judged when testing, and if too great restrict the air circulation or increase the moisture content of the air. Many machines are supplied with moisture trays. These trays



From "Artificial Incubation and Brooding."]

PLATE 134.—TESTING EGGS FOR FERTILITY.

(For Description of Plate, see page 546).

should be filled from the first of the hatch and refilled at frequent intervals. Where moisture trays are not supplied the air which passes into the machine is charged with a certain amount of moisture. To charge the air with moisture for this variety of machine the floor should be well wetted daily. Good ventilation is equally essential for the growth of the chicken within the egg as it is for the development of the chick when hatched. Without oxygen the changing of the egg content into a lousy chicken is impossible. If a fertile egg is examined on the seventh day a network of blood vessels can be seen near the shell and near the air cell. The blood stream not only converts the food into the embryo but it carries off the waste product (carbon dioxide), and without a good circulation of air this poisonous gas is not removed sufficiently fast, and consequently has a weakening effect on the developing embryo. It will be understood that the more advanced the embryo is the greater is the need of oxygen and the greater will be the amount of carbon dioxide given off; therefore, what will be the correct ventilation for eggs, say, a week old will not suffice when the eggs are in the third week of development. The increasing of the ventilation at this period will also assist in the regulation of the temperature of the incubator. Again, when the chicks hatch the ventilation should be increased, and if the chicks still pant the door of the machine could be slightly open and fixed in that position.

The Hatch.

After the last turning, on the nineteenth day, close the incubator and do not disturb it until the hatch is over. When the chicks have dried off give all the ventilation possible, darken the doors to prevent them picking at droppings or the toes on one another. It is as well to let them remain under this condition for about twenty-four hours, when they should be removed to the brooder. In doing so take every precaution to prevent them being chilled, as chills at this stage would prove disastrous.

Disinfection.

Immediately the chickens have been removed from the machine it should be thoroughly cleansed and disinfected. A good disinfectant is formalin. Any other good coal tar disinfectant may be used. The machine should then be closed up for a while to induce the fumes to penetrate every crack and corner, then allowed to dry and aired thoroughly before being used again.

DESCRIPTION OF PLATE.

1. New-laid egg, small air-cell and transparent.
2. Fertile egg, seven days' incubation.
3. Fertile egg, fourteen days' incubation.
4. Fertile egg, nineteen days' incubation.

It will be noticed that the air-cell increases during the period of incubation. Operators should take this plate as a guide to normal development.



PLATE 135.—THE DUKE OF YORK'S BRISBANE ESCORT. A TROOP OF QUEENSLAND MOUNTED POLICE.

The magnificent chargers were bred at the Queensland Police Remount Station, Rewan

QUEENSLAND AGRICULTURAL COLLEGE.**STUDENTS' ACTIVITIES.**

The subjoined notes on life and work at the Queensland Agricultural High School and College, supplied by the students themselves, have, it is thought, an especial interest for all concerned with agricultural education and progress.—ED.

Much water has flowed along the bed of the Lockyer since the establishment of the College and, with the exception of a short period in 1913-14, no attempt has been made to record the activities and life of the institution.

Through the generosity of the Editor of this Journal, space has now been made available for us to record the doings of the College.

The commencement of the year saw the establishment of the Faculty of Agriculture, and the College was honoured by the appointment of the Principal as first Professor. We congratulate Mr. Murray on his appointment and feel sure that the destinies of the Faculty are in good hands and that Queensland will benefit by having a steady stream of trained men in her midst who will be fitted to solve some of the many problems that face the agriculturist.

The Easter Tractor School.

During the Easter vacation a school of instruction was held for the benefit of farmers interested in tractors. Queensland was the first State to recognise the importance of tractor or power farming, and the attendance at the school proved that there is a demand for vocational education. The tractors in use were:—Fordson caterpillar, Fordson wheel tractor with a rototiller attached, Hart Parr, McCormic Deering, Fitch, Twin City, Case, John Deer, and British Wallis.

In the course of the day lectures were delivered by the Principal and staff, and the evenings were filled in with lectures and educational pictures projected by the College cinematograph.

Question time (7 to 7.30) was always an interesting time, and many were the posers put by the farmers. Much information was gained through the answers to these questions, and we venture to think that this was the most profitable time spent during the course. In the afternoons the students were divided into groups and taken to the paddocks to learn to drive and handle the several types of tractors. A dance was held in the course of the school and proved very popular. At the conclusion of the school an enjoyable picnic was held at Glenore Grove, at which various sporting events were decided. We feel sure that the farmers who attended the tractor school had an enjoyable as well as an instructive time.

Before leaving they presented the College with a substantial cheque for the purchase of some memento of the fourth tractor school. This generosity showed in a tangible form that the farmers appreciate the work that is being done by the College.

Office Bearers, 1927.

Senior Prefect: R. J. McAllister.

Prefects: T. G. Graham, J. C. Spencer, W. P. Hamon, R. H. Grigg, R. K. Palmer, W. G. Steele, H. C. Stephens.

Cricket Captain: W. Nixon-Smith.

Cricket Committee: W. Nixon-Smith, A. M. Himstedt, A. Nixon-Smith.

Tennis Captain: W. G. Steele.

Tennis Committee: W. G. Steele, R. K. Palmer, A. Wallace.

Shooting Committee: R. J. McAllister, J. C. Spencer, W. P. Hamon, W. Nixon-Smith, H. Smith, O. Pommer.

Editor, Old Boys' Column: C. S. Christian.

Football Captain: W. Nixon-Smith.

Football Committee: W. Nixon-Smith, A. Nixon-Smith, R. J. McAllister.

Magazine Editor: T. G. Graham.

Magazine Secretary: W. P. Hamon.

Magazine Committee: R. J. McAllister, J. C. Spencer, T. G. Graham, W. G. Steele, W. P. Hamon, R. H. Grigg, R. K. Palmer, H. C. Stephens.

Dance Committee: R. J. McAllister, J. C. Spencer, T. G. Graham, R. K. Palmer, W. G. Steele, R. H. Grigg, W. P. Hamon, H. C. Stephens.

Colours Awarded, 1926.

Football: R. McAllister, W. Nixon-Smith, A. Nixon-Smith, C. Schroder, J. Spencer, T. Graham, I. Williams, N. Copeman, O. Pommer, P. Hamon, V. Brimblecombe, J. Ferguson, F. Benham, L. Pottinger.

Cricket: C. Christian, C. Schroder, J. Ferguson, G. Sigley, T. Graham, P. Hamon, A. Pepper.

Tennis: A. McKenzie, W. Aplin, R. Palmer, C. Christian.

Athletics: C. Schroder, D. O. Atherton, T. Graham, R. McAllister.

Winner of Senior Cup: C. Schroder.

Winner of Junior Cup: A. Himstedt.

Shooting: A. F. Moodie, J. Harvey, L. Pickles, P. Hamon, J. Spencer, I. Williams.

Cup Winner: A. F. Moodie.

The Duke's Visit to Gatton.

On the morning of the 6th April the staff and students journeyed to Gatton to take part in the reception to Their Royal Highnesses the Duke and Duchess of York. The students were drawn up in their respective years with the staff in front and the veterinary section under Sergeant McAllister on the left. Time limited the formalities. Their Royal Highnesses inspected the school children and the mothers of fallen soldiers. Our Principal was presented to the Duke, who complimented him on the parade.

The Toowoomba Camp.

This year the veterinary corps again journeyed to Toowoomba for their annual training in camp. After a fortnight's training, the nine new recruits were equal to the old hands, and on the morning of the 8th March the corps turned out in good form under Major McKenzie, Sergeant McAllister, and Lance-Sergeant Hamon.

The corps camped in Newtown Park with the 11th Light Horse Regiment and carried out veterinary work and general camp drill.

Four of the corps passed examinations for corporal, and the general work of all was highly commended by the Colonel.

Judging at the Toowoomba Show.

Several members of the fifth year visited Toowoomba during the Show and participated in the young judges' competition. The results were—

Berkshire boar: R. J. McAllister 2nd, J. Spencer, R. Price P. Hamon 3rd, and T. Graham 4th.

Dairy cattle: R. J. McAllister 2nd.

Social and Other Activities.

The social side of life is not neglected at the College and all tastes are well served. Football is the most popular sport at present. In the 1926 season the team met with decided success, being defeated only on one occasion. There is the disadvantage of not being able to affiliate with the Secondary Schools Association, but nevertheless non-competitive games are played with the several schools, besides other outside teams.

"A VALUABLE JOURNAL."

Writing (19th May, 1927) to renew his subscription a Pomona farmer says:—"I might say that there is a lot of useful information to be gained from reading this valuable publication (the 'Agricultural Journal')."

FARM TRACTORS AND TRANSMISSION.

By E. T. BROWN.*

It is not altogether an easy thing to start up a large tractor at any time, but the job is rendered much more laborious when the weather is cold. The majority of tractors, however, are fitted with some device to make starting up easier, such as an impulse starter or a decompressor. There is a lot, though, in knowing how to swing the engine properly. As a rule, with kerosene burning engines a second tank is provided for petrol, on which liquid the tractor is started. The reason, of course, is that petrol is a much more volatile liquid than kerosene and therefore vaporises more readily. As has been explained before, the spark must be retarded, because otherwise the engine may backfire with serious results to the operator. In this connection references may be made to a new safety device that has recently been introduced. It is so constructed that in the event of a backfire the tendency of the starting handle to rotate in the opposite direction is checked.

Priming and Swinging.

It is a usual practice to inject a little petrol into the cylinders by means of the compression taps on the cylinder heads. This ensures the cylinders receiving a charge of explosive mixture. Only a small quantity of petrol should be used for priming, and it is an excellent plan to inject this spirit into the cylinders some minutes before starting up. The amount of swinging that is required depends on two things—namely the efficiency of the engine and the way the engine is turned over. The former, of course, is dependent on the nicety of adjustment of the various parts. The first action should be to turn the engine over twice slowly. As in this way one cylinder will be filled with compressed gas and be ready for firing. Then a sudden jerk upwards of the handle or a rapid swing will start the engine. Run on petrol for a few minutes—until the engine gets warm—before turning on the kerosene fuel.

The Tools—Where are They?

During my recent tour of the country I have, on more than one occasion, lent a hand in overhauling a farm tractor. This is work that appeals to me, but I must confess that I like to do the work in a proper fashion. More than once I have been assured by the tractor owner that he possessed a complete kit of tools, but when they were required the most important tools were generally hidden away in some unknown place. On the chance that some of you are in the same position, may I give you the same advice as I gave verbally to those people I met? It is quite simple, but it certainly makes for better and more comfortable work. It is this: Keep your tractor shed, or the special shop which you have for the purpose, tidy. It is only when you are in a hurry that you are likely to require any special tool or spare part, and this is just the occasion when you cannot afford the time to look for anything. Have racks on the walls on which to hang your tools, and have a number of pigeon holes for storing all of the many small parts, such as nuts, bolts, washers, screws, &c., which you are bound to keep on hand. Then, when anything is required, you will be able to lay your hand on it at once. It is only a small matter, but you will speedily realise how convenient it is to have your workshop tidy and orderly.

The Needle Valve.

One of those small parts of the engine that can decrease the efficiency of the outfit very considerably is the needle valve of the carburetter. The needle valve is constantly working when the engine is running, and in course of time its seating becomes worn and, perhaps, pitted. When this happens there is always a danger that the carburetter will flood, that is, a too large supply of fuel will enter the float chamber. This may be so bad that the fuel flows out, in which case it is wasted. If the flooding occurs suddenly it may be, of course, that a tiny atom of grit or dust has found its way into the valve, in which case a few turns of the needle between the thumb and finger will generally remove it. If the valve requires grinding-in it can be done very easily, although it is a rather tedious job. A little valve paste or crocus powder and oil should be smeared on the seating and the needle, and the latter turned in its seating until the defect is remedied. A good seating is essential if the carburetter is to work properly.

Oil Level in the Gear Box.

In a great many makes of tractors the transmission is by means of a series of toothed wheels contained in a gear box and running in oil. To secure easy and silent running it is essential that the level of the oil in the gear box should be

* In the "Farmer and Settler."

maintained more or less constant, and to this end the box should be inspected from time to time. It is not necessary to make the inspection very frequently, but it should be done about once every three months. The only time when it is advisable to do so more often is if it be noticed that the oil is leaking at all. The best results are obtained when the oil reaches to the centre of the highest shaft in the gear box, as then it will be certain that all of the gear wheels will be properly lubricated. Special gear oil should be used exclusively, because no other oil is suitable for the purpose. Even this, however, may get rather on the thin side during a spell of very hot weather, in which case it will require to be thickened. The best way to do this is to add a little grease—the quantity being that amount which will bring the oil to its original consistency. If too much be added the oil will become so thick that the gear wheels will cut paths for themselves and these will fail to fill in; hence the wheels will suffer.

OILING THE OUTFIT.

It is surprising what a large number of tractor owners and operators cannot quite understand why it is so essential to pay such strict attention to the whole subject of lubrication, whether of the engine itself or the various working parts. And yet the reason is a very simple one, indeed. It amounts to this: Whenever two surfaces rub together friction is set up. The heat generated by friction causes the surfaces to wear away rapidly, but, moreover, the heat would prevent the movement of the surfaces in a very short while.

The whole object of lubricating the working parts, as they are called, is to cover the surfaces in contact with a thin film of oil so that friction will be reduced, the heat dispelled, and wear reduced to a minimum. Once fail to maintain this film of oil on each and every part, whether it be the big ends of the connecting rods, the crankshaft bearings, the gear wheels, or the wheels, and you will very quickly realise your mistake, because your repair bill will mount by leaps and bounds. The damage that is done by want of oil is always expensive to make good, and you may very easily run yourself in for a big account by neglecting the simple yet necessary precaution of keeping all parts properly oiled or greased. It does take a certain amount of time to fill up all the grease cups and the oilers, especially as so many of these are in inaccessible places, but it is work that has to be done if the outfit is to prove efficient and to have a long life.

Systems of Engine Lubrication.

The lubrication of the engine is the easiest part of the whole business.

Fortunately for the tractor operator the various systems for lubricating the engine in use to-day are automatic in action. As long as the oil reservoir is kept filled, the pipes free from foreign matter, the strainer clean, the oil in the sump renewed as occasion demands, and the feed mechanism in proper working order, all will go well. This sounds a lot, but it is really nothing, since very little does and can go wrong in these various directions. Sufficient oil is supplied to the engine for its requirements, whether it be working at full speed or at a lower rate. As a general rule a quantity of oil is contained in the lower half of the crank chamber and by a small mechanically-operated pump it is forced to the big end and other bearings. As the oil drips from the big end the movement of the crankshaft throws the oil on to the wall of the cylinder and thence it permeates throughout. It returns eventually to the oil sump in the base to be used again. Some engines are lubricated by what is known as the splash system. In this case the oil is fed automatically to the sump by the action of a pump. A dipper is attached to the lower part of the big end and as the crankshaft revolves a small quantity of oil is scooped up and flung over the bearings and on to the walls of the cylinder. This is a simple method, and as long as the pump is working properly there is practically nothing that can get out of order. With many makes the oil on its way to the base is made to pass through a glass tube on the dash, or elsewhere in sight of the driver, so that it can be noted instantly if anything goes wrong with the pump.

The Oil to Use.

There are many drivers who pay really strict attention to the proper lubrication of their outfits, but even then fail to obtain the best results.

This is due almost entirely to the fact that they are not so careful in selecting the right oil for their special machine as they are in using it.

Whatever oil is employed must be suitable for the machine that is being used.

There are many excellent lubricating oils on the market to-day, but each one is prepared for a definite type of tractor. An oil may be excellent in every way, but this does not say that it is the best oil for your outfit. The importance of this

subject is so little appreciated that it is one of the commonest things for tractor owners to order so many gallons of oil without ever specifying what kind is required. They accept any lubricating oil that is given to them, irrespective as to its suitability or not. Use the oil that is recommended by the maker of your tractor, but, failing this, get into touch with a firm that specialises in tractor oil, tell them definitely the type and make of your machine, the system of lubrication, the normal crankshaft speed, and the horse-power. Such a firm will then advise you and you can rely upon obtaining an oil that will give absolute satisfaction in every way.

The cost of a high-grade oil is a little more in the first place than that of a low-grade lubricant, but, seeing that much more of the latter is required and that it cannot withstand the heat so well, it is very much cheaper in the long run to secure the best procurable. The efficiency of the engine will be increased and the wear and tear of the working parts considerably reduced by using a suitable high-grade oil.

Brake Adjustment.

Most tractors are fitted with internal-expanding or external-contracting type of brake. Each is easy to adjust, and should be set in such a way that there is no friction when the brake is not being used, yet it should grip well when it is applied. From time to time it may be necessary to reline the shoes, but this is quite a simple job, and any good amateur can manage it. The best lining to employ is that made of asbestos and brass wire woven together, and this can be obtained from any motor store or garage. Holes should be drilled in the fabric to correspond with the holes in the shoes and copper rivets should be employed. The holes must be countersunk so that rivet heads will sink well into the fabric. Inattention to the brakes may result in a serious accident, and thus they should always be kept correctly adjusted.

SALT FROM SEA WATER.

NEW QUEENSLAND INDUSTRY AT BOWEN.

Common salt is the most important product obtained by the evaporation of sea water, some being prepared in almost every country in the world. White salt is usually a cheap product. It is essential for human life, and therefore its manufacture is always of importance. The establishment of salt works at Bowen has a special interest for graziers and other large users of salt in Queensland. As a new secondary industry that will help to improve the local market for primary products, it is not without interest to the farmer either. The essentials for the manufacture of salt from sea-water by solar evaporation are suitable clay flats close to the sea and high evaporation.

Bowen has both of these. There evaporation is the highest on the eastern coast of Australia, and the clay pans being worked by Bowen Salt Limited, the operating enterprise, are adjoining the town boundary, close to the railway and electric power station, from which the required power is obtained.

The process of manufacturing salt from sea-water is as follows:—Sea-water is pumped by an electrically-driven pump at the rate of 300,000 gallons per hour into the first of five large evaporating areas, from which it is gravitated slowly from one to the other, the flow being controlled by suitable sluice gates. On reaching the last area the saturated brine is lifted by another electrically-driven pump into the crystallising areas, of which there are fifteen. In these areas the brine stands until all the commercially pure salt is deposited, when the mother liquor is drained off, the salt lifted into sacks, and hauled by a kerosene tractor to the stacking plans. The salt is washed and elevated into a large stacking shed, then crushed to a requisite size, bagged, and placed on trucks at the works siding for transit.

The company was inaugurated and works laid in 1926, and was successful in producing 500 tons of high-grade salt during the last weeks of the 1926 season; this was something like a record in solar salt production in Australia.

The equipment of this salt pan and its subdivisional areas, together with the necessary plant, machinery, stacking shed, and railway siding, may now be said to be complete and everything in readiness for the first full season's operations, which have already commenced. It is expected that at least 10,000 tons will be

produced. This will be disposed of, either as coarse salt required by numerous industries, particularly meat works and butcheries, or as salt lick for sheep and cattle.

The site selected for the works and refinery is alongside the main railway line from Brisbane to Townsville, half a mile from the Bowen railway station.

Bowen possesses one of the finest natural harbours on the coast of Australia, and it requires no dredging. Some of the largest vessels trading to and from these shores, registering up to 12,000 tons, now berth without any difficulty alongside the coal wharf. For loading purposes for export an electric transporter crane is available with a capacity of 20 tons per lift. This crane is the largest in the Southern Hemisphere.

The Bowen coalfields are only 51 miles from the works. The rich deposits of coal are practically inexhaustible and the quality beyond question, and these should have an important bearing on industrial development in Northern Queensland.



PLATE 136.—EVAPORATING AREA, BOWEN SALT WORKS, NORTH QUEENSLAND.
LARGE STORAGE SHED IN RIGHT BACKGROUND.



PLATE 137.—A NEW QUEENSLAND INDUSTRY. SALT WON BY SOLAR EVAPORATION,
BOWEN SALT WORKS.

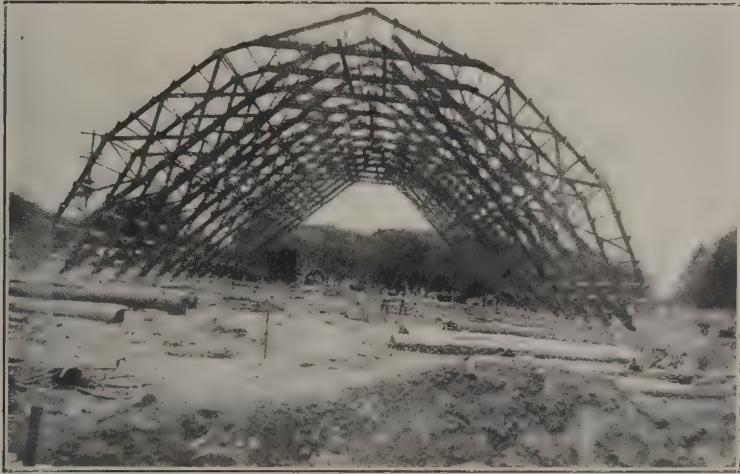


PLATE 138.—THE LARGE STORAGE SHED AT BOWEN SALT WORKS.
Showing details of construction, which is of wood on concrete base; capacity,
7,000 tons.



PLATE 139.—PUMPING STATION, BOWEN SALT LIMITED. BOWEN, NORTH QUEENSLAND.

Answers to Correspondents.

Clay Soil Treatment.

M. McE. (Gayndah)—

The Agricultural Chemist, Mr. J. C. Brünlich, advises an application of about $\frac{1}{4}$ lb. of air-slaked quicklime broadcasted and slightly hoed under should make the clay more crumbly. Afterwards apply plenty of leaf mould or stable manure to increase humus contents and make the soil looser.

BOTANY.

The Government Botanist, Mr. C. T. White, F.L.S., addressed the following replies to correspondents in the course of the month. They are selected from a heavy mail because of their general interest.

Western Plants Identified.

M. McE. (Gayndah)—

J.E.T. (Longreach)—Determinations of additional specimens:—

12. *Boerhaavia diffusa*. Tar Vine or Sticky Weed.
13. *Salsola Kali*. A Roly Poly.
14. *Euphorbia eremophila*. Bottle-tree caustic.
- 15.
16. *Acacia homalophylla*? Boree.
17. *Euphorbia Coghlani*. Caustic bush.
18. *Corchorus olitorius*.
19. *Andrachne Decaimi*. Family Euphorbiaceæ.
20. *Rhynchrosia minima*. Family Leguminosæ.
21. *Ipomæa reptans*. Wild Potato.
22. *Chenopodium auricomum*. Blue bush.
23. *Sesbania ægyptiaca*. Both this and *S. aculeata* are known throughout the West as "Sesbania Pea."
24. *Aristida Behriana*? Feather Cap. A 3-pronged spear grass. The Australian grasses belonging to this genus are but poorly classified; they are at present being monographed by a specialist, and when his account is published we may be able to give specific determinations with greater certainty.
25. *Cyperus* sp.
26. *Andropogon intermedius*.
28. *Aristida leptopoda*? See note under No. 24.
29. *Pappophorum avenaceum*.
30. *Tragus racemosus*. Small Burr Grass.
31. *Panicum divaricatissimum*.
33. *Eragrostis leptocarpa*.
34. *Chloris pectinata*. Star Grass or Umbrella Grass.
35. *Panicum crus-galli*.
36. *Eriochloa punctata*.
37. *Tribulus terrestris*. Caltrops or Bull-head. The latter name I might say is applied in Queensland to a number of burr plants.
38. Two plants were in this envelope. The one identical with No. 12 the other with No. 37.
39. *Fentilago viminalis*. "Supple Jack" or "Vine Tree."

"Indian Laburnum" or "Golden Shower."

L.B. (Kulara, N.Q.)—

The specimens represent *Cassia fistula*, the "Indian Laburnum" or "Golden Shower," a native of India and Ceylon, widely grown throughout the tropics and sub-tropics as an ornamental flowering tree. In Queensland the long pods are known as "Cascara Beans," but cascara of commerce is, of course, the product of a very different tree.

Whitewood Foliage as Stock Food.

INQUIRER (Brisbane)—

The specimen of "Whitewood" forwarded by you some time ago was too small for analysis. In the course of the reply, which dealt mainly with Gidyea poisoning, we said:—

"A specimen of Whitewood was handed over to me at the same time. It is *Atalaya hemiglauc*, known universally throughout Western Queensland as "Whitewood." It is a good fodder but the young shoots are said to give horses the staggers. This, however, is a question on which we have no very definite information."

It is rather a strange fact that only in Central and North Queensland is Whitewood accused of causing staggers in stock. The tree is abundant throughout Western Queensland and New South Wales, but one never hears of the Southern trees as the cause of any trouble though it is freely fed on everywhere by horses, sheep, and cattle.

"Potato Bush."

N.P. (Townsville)—The three specimens proved to be:—

A. *Andropogon fragilis*.

B. *Andropogon filipendulus*.

C. *Solanum esuriale*. "Potato Bush." Regarding this last I may say it has several times been accused of being injurious to stock. We have no very definite information about the plant, however, based on feeding or other tests. Until tested, practically all species of *Solanum* can be looked on with suspicion.

Poisoning of Noxious Weeds and Grasses.

E.C. (Bundaberg)—Your inquiry was referred to the Agricultural Chemist, Mr. J. C. Brünnich, who advises:—

In Hawaii an arsenical solution, containing 3½ lb. of arsenic and 1½ lb. of caustic soda in 100 gallons of water, is used as a spray for killing weeds in sugar-cane crops. This spray is particularly effective for young succulent weeds, but does not eradicate couch grass or nut grass. The quantities used are so small that there is little danger of poisoning the soil and sugar-cane. Of course, any spray falling on sugar-cane will kill the leaves, and therefore care must be taken not to spray the cane. Stray stock eating the poisoned weeds might be killed. The spraying is economic if the weeds are killed in their youngest stages of growth.

Arsenic pentoxide, sold by the Prickly-pear Commission, could be used successfully, and dissolves readily without caustic soda, and as this poison is sold at 3d. per lb., the solution of about 4 to 6 lb. per 100 gallons would be very cheap.

"Khaki Weed."

C.R.D. (Proserpine)—

No. 1.—*Alternanthera Achyrantha*. The Khaki Weed. This has become a serious pest in some districts. It is extremely difficult to eradicate, due to practically every bit of the stem being capable of forming a new plant when cut.

No. 2.—*Tridax procumbens*. A very common weed in Coastal Queensland. We have not heard a local name given to it. It is a native of Tropical America, but is now widely distributed as a weed over the tropical regions of the globe. Apart from its aggressive character as a weed it is not known to possess any harmful properties.

A Weed Spray.

INQUIRER (Cooroy)—

The Agricultural Chemist (Mr. J. C. Brünnich) regarding the mixing of arsenic and caustic soda advises:—

For poisoning succulent weeds spray with a solution of 4 lb. of arsenic dissolved by the aid of 1½ lb. of caustic soda in a few gallons of water to make up to 100 gallons. The amount of spray used is so small as not to injure the soil. Washing soda is just as dangerous as caustic soda when used in larger amounts. Grass is not permanently destroyed by this spray.

SHEEP AND WOOL.

Following are selected replies to correspondents by the Instructor in Sheep and Wool, Mr. W. G. Brown, in the course of the month.

Sheep Ailments.

J.R. (Bungunyah)—

The matter of the sheep standing with head high and partially blind points to one or two causes for same. The paddy melon vine is reputedly a poisonous plant, and, personally, I have seen many sheep go blind from eating the plant or the paddy melon fruit, but I have never seen any die from eating it.

In the second case submitted, this matter of the swelling on the face, ears, and lips has been a common occurrence in the Southern districts this year. I believe it to be dietetic or something which they have eaten. The effect of cyanide is sudden death, and I doubt if it is a mineral or any other poison of that kind. It is quite possible that the caustic weed is to blame; it is very plentiful this season.

In regard to the third case where sheep died while being crutched, this is a common thing in very hot weather or if the sheep be bumped on its breech with a stomach full of grass. Sheep, like other animals, which include human beings, sometimes die suddenly from heart failure.

"A MOST USEFUL PUBLICATION."

A Proserpine farmer writes (6th May, 1927):—"I think the 'Agricultural Journal' is a most useful publication to the man on the land. I read mine over many times."



PLATE 140.—PORTION OF TYPICAL NORTHERN FARM—THE WOODLANDS—BOWEN, NORTH QUEENSLAND

General Notes.

Tropical Plant Supply.

The Agri-Horticultural Society of Madras, India, which is subsidised by the Madras Government, advises that it will always gladly meet the requirements of Queensland farmers in regard to all seed of tropical plant material, including hedge plants, avenue trees, grasses, and other plants of economic or ornamental value at moderate cost.

Protecting the Peanut Industry.

It has recently been decided, for the purpose of protecting the peanut-growing industry in Australia from various destructive diseases, to modify the Proclamation gazetted on 27th January last (Quarantine Proclamation No. 167) by prohibiting the importation into Australia of peanut plants (including the seed) of the variety *Arachis hypogea*, except by permission of the Federal Authority. The importation of peanuts is being discouraged as much as possible, and permission for the importation of peanuts will be given only in exceptional circumstances.

Royal Society of Queensland.

The ordinary monthly meeting of the Society was held in the Geology Lecture Theatre on Monday evening, 2nd May, 1927. The President, Professor E. J. Goddard, was in the chair.

The following were unanimously elected as ordinary members:—J. H. Smith, Esq., M.Sc.; G. C. Taylor, Esq., M.B., Ch.M.; Miss L. Crawford; Miss M. Fitzgerald, B.Sc.; and Miss G. Jones.

Professor H. C. Richards exhibited a number of lantern slides of the Great Barrier Reef, illustrating its geology, fauna, and flora. Mr. H. Tryon and the President commented on the subjects.

Mr. H. A. Longman exhibited—(1) The spurs of the common game rooster used as weapons by aboriginal women; (2) a pointing bone composed of a tibio-tarsus and fibula of an emu and used by aboriginal medicine men (aboriginals from mission stations visiting the museum avoid contact with these bones, even after lengthy contact with civilisation); (3) an aboriginal calvarium (Q.E. 561) from Wynnum—this was an unusually thick and heavy dolichocephalic skull, probably in the process of becoming fossilized. Comments were made by Mr. Tryon, Dr. Marks, and the President. (The first two exhibits shown by Mr. Longman were presented to the museum by the late Mr. Thos. Illidge.)

Dr. Bryan exhibited fossil plants typical of the Ipswich series from the north bank of the Pine River almost opposite the confluence of the North Pine and South Pine Rivers. This forms a new locality record, as the area has been mapped as of Tertiary age. The chief plant present is *Cladophlebis australis*.

Dr. F. W. Whitehouse exhibited a collection of Cambrian trilobites from most of the known Australian localities. Thirteen genera, six of them being new, were represented. Among the new locality records were the following:—(a) Species of *Dinesus* and (?) *Notasaphus* from the South Templeton River (N.W. Queensland), in a Middle Cambrian fauna; (b) specimens of *Eodiscus significans* (Eth. fil.) and *Agnostus elkedraensis* (Eth. fil.), from the South Templeton River (a new record for Queensland); (c) a species of *Tsinania* from Caroline Creek, Tasmania. This genus, from the top of the Cambrian, is known otherwise only in China and North America. The following stratigraphical correlations were suggested:—*Upper Cambrian*: Beds of Florentine Valley, Caroline Creek, and Dolodrook; *High in Middle Cambrian*: Beds of Alexandra Station (N.T.), Elkedra (N.T.), Templeton River, and Heathcote; *Low in Middle Cambrian*: Beds of Yelvortoft (N.W. Queensland), Parara, and near Wirralpa. (South Australia), and Mount Panton (N.T.).

The Secretary communicated a paper by Dr. Thos. L. Bancroft entitled "Preliminary Notes on the Occurrence of Flagellates in the Juice of Certain Queensland Plants." A flagellate was found in the latex of the Asclepiadaceous plants *Sarcostemma australe* and *Hoya australis*, a larger species in *Secomone elliptica*, and a different kind again in *Ficus scabra*. *Oncopeltus quadriguttatus*, a bug which sucks the juice of the first two plants, had flagellates in its intestines. Microscopic preparations and specimens of the bug were exhibited. Comments were made by Messrs. Tryon and Herbert and the President.

Night Ploughing by Tractor.

With tractors working night and day large areas are being sown to wheat in the western districts of New South Wales. Weather conditions for sowing are ideal, and as soon as one man comes off the tractor another takes his place. It is apparent that many wheatgrowers who were not advanced with their sowing operations last season, when there were weeks of wet weather, do not desire to be caught unprepared on this occasion.

Staff Changes and Appointments.

Messrs. V. Ganter, E. Meiland, W. M. Mortensen, and F. A. Richter, of Byfield, *vid* Yeppoon, and Mr. J. P. J. Sexton, of Maryvale, have been appointed Officers under and for the purposes of the Animals and Birds Acts.

Mr. L. P. Doyle, Inspector of Stock, Cooyar, has been also appointed Inspector of Brands.

It was recently approved that Mr. J. A. Stockdale, Inspector, Diseases in Plants Act, of Wallangarra, be transferred to Stanthorpe. It has, however, now been approved that Mr. Stockdale be transferred to Brisbane.

Broom Millet Board Election.

The result of the annual election for the appointment of two members to the Broom Millet Board was:—

Hans Niemeyer (Hatton Vale)	139 votes.
Erich M. Schneider (Binjour Plateau)	107 "
Frederick H. V. Goodchild (Degilbo)	102 "
William M. Hutchinson (Duleen)	76 "
James Scanlan (Flagstone Creek)	50 "

The two first-named candidates will be appointed for a term of one year. Messrs. Niemeyer and Goodchild were the retiring members.

The University and the Nation.

The University has a national purpose. Year after year she takes from the nation an ever-increasing company of the aspiring youth, passes them through a process of training, and sends them forth upon their mission in the world. The University is thus the masterpiece and the crown of a national system of education.

It is therefore the duty of the nation to see that her needs are satisfied and her standards maintained; and the nation which fails to cherish the University will lack both the thinkers and the artisans of progress. Modern civilisation is the offspring of science in all its forms, and the offspring cannot flourish unless the parent is sustained.—“Dominion” (New Zealand).

Human Kindness.

There is no such thing as absolute individualism. Our influence, conscious and unconscious, is far-reaching, and we cannot ever bury it with us. It goes on for good or evil. Our opportunities to encourage others, to cheer them with a kind word and a gracious deed, bring with them a challenge and a destiny. We may or may not succeed in what we aim at, but we are the gainers by the effort. We are repaid a hundred-fold whether our work prospers or not. It is always open to us to help others by pointing out that they possess qualities which, if developed, would bring them to the success they covet. Kind words are worth much, and cost little—

It is a little thing to speak a phrase
Of common comfort, which by daily use
Has almost lost its sense; yet, on the ear
Of him who thought to die unmourned, 'twill fall
Like choicest music.

It is related that on a winter day that great preacher, Henry Ward Beecher, said to a newsboy, “Are you not cold?” “I was, sir,” said the boy, “till I saw you.” A kind smile, a kind word, a kind heart, will change a winter into summer.—“Age” (Melbourne).

Potted Asparagus—A New Industry.

Bathurst (N.S.W.) has a new industry, that of canning asparagus. Messrs. Gordon Edgell and Sons have installed on their orchard at Bradwardine, about three miles from Bathurst, a modern canning plant, housed in a model factory of reinforced concrete, with a floor area of 3,000 square feet. Mr. Maxwell Edgell, when touring America, made a study of the asparagus canning business in the largest works in California. This was equipped with the very latest in canning machinery, all the cooking, blanching, and exhausting processes being done by steam. His factory is modelled on this plan.

Bathurst asparagus, in its fresh state, has topped the Sydney market for some years, and it has been found that the asparagus grown on the fertile river flats of Bradwardine, particularly since the more recent method of planting in long rows instead of broadcast was adopted, is specially suitable for canning. As the season for fresh asparagus in the district is limited to a few weeks each year, in order to utilise the plant during the remaining months, Messrs. Edgell and Sons intend canning apples.

Paspalum Pasture Renovation.

A constant source of annoyance to dairy farmers on the New South Wales coast has been the old and matted *paspalum* pastures that fail them in winter, and often in summer also. The *paspalum* renovation experiments instituted by the New South Wales Department of Agriculture about two years ago on farmers' plots in the Richmond, Brunswick, and Tweed River districts, however, are beginning to show tangible results.

A round of inspection of these plots was made recently by the agrostologist (Mr. Whittet). The superiority of the ploughed areas as regards palatability of growth was very apparent. It was satisfactory also to find that, as a result of their observations of the experiments, many farmers were adopting this method of dealing with matted *paspalum* where ploughing was possible. The outstanding feature of the top-dressing section of the experiments was the success obtained from the use of a mixture of 2 cwt. of superphosphate and $\frac{1}{2}$ cwt. of sulphate ammonia an acre in alternate years.

Specially noticeable was the growth of white clover on plots that were top-dressed, in August, 1925, thus demonstrating the residual effect of manures and of superphosphate in particular. The adjoining unmanured areas showed no sign of clover. This comparison in favour of top-dressing was of great importance to the dairyman, from the point of view of early winter pasturage, as there is generally a shortage of clover growth at this time of the year.

Overheated Motor Engine.

An overheated engine of a motor-car may be the sign of some serious mechanical difficulty.

Many motorists think that a fresh supply of water will always act as a cure for an overheated engine. This is not true when the overheating has progressed to the stage where it injures the cylinders, pistons, and bearings.

For example, bearings will crack if subjected to intense heat. Heat causes oil to lose its lubricating power, and therefore great heat may cause frictional scoring of the cylinder walls and wearing of the pistons.

On the other hand, overheating may mean that the radiator is leaking or that the driver has forgotten to fill it, or that it is clogged with sediment from dirty water. It may also mean that the car has been driven for a long distance in first or second gear, or that the fan belt is not at proper tension to give an adequate cooling draft.

If overheating occurs on the road the car should be stopped, and an investigation made. If the cooling system be filled up with cold water after the engine has cooled to a certain extent, temporary relief will be afforded.

When it is absolutely necessary to continue the journey the engine should be overfed with oil. Although this may cause it to give off volumes of smoke through the exhaust, the additional oil will protect the cylinders and pistons. In the event of water or oil not being available, and the cause of the overheating cannot be ascertained, help should be obtained from the nearest garage.

As a general precaution, the radiator of the car should always be kept full of water.

The Farm Tractor—Some Don'ts.

Advice is not always acceptable, especially to those who think that they know quite a lot, but the following points state in a very succinct way those things that should not be done with or to a tractor.

- Don't try to make a racing car out of your tractor.
- Don't drive over rough places when it can be avoided.
- Don't allow dirt and oil to accumulate on frame, engine, axles, &c.
- Don't forget split pins and lock nuts.
- Don't allow the engine to run at high speeds under no load.
- Don't neglect the oiling of any part of the tractor.
- Don't leave the tractor over night in cold weather without drawing off the water.
- Don't run the engine if it is knocking, pounding, squeaking, or grinding.
- Don't screw nuts hard enough to strip the thread off the nut or bolt.
- Don't blame the tractor or its makers for trouble that has been caused through your own carelessness.

The Compost Heap.

The compost heap is a most valuable adjunct to the vegetable garden, and it is a very great pity that it is not to be found more frequently even on the ordinary farm.

A heap or pit can be made very economically, and is of special value in that it utilises all sorts of vegetable and animal refuse, which would otherwise be wasted, and converts it into a valuable manure, rich in vegetable matter and eminently suited for intensive cultural conditions.

The principle upon which the compost heap acts is the fermentation of easily decomposed vegetable material in the presence of earth and lime. Not only are substances like peat and straw, which form the usual basis of compost heaps, thus decomposable, but almost every kind of organic substance, both of vegetable and animal origin, can be composted. Dead leaves, bush scrapings, weeds, tops and stalks of vegetables, as well as bone and animal refuse, can be treated in this manner. In the case of animal refuse the operation is much slower, and substances like bones should be crushed first. It is also important to be sure that animal refuse so treated is not derived from a deceased source.

The method of making and maintaining the compost heap will vary largely with local surroundings. As a general method of procedure the following will be found satisfactory:—Make a heap with alternate layers of earth, refuse, and lime. Under the term refuse is included all the waste material, either animal or vegetable, mentioned above. Cover the whole with a layer of earth. When a sufficient quantity of refuse is again collected, place it on top of the heap and cover with a layer of lime, and lastly of earth, until the heap is 3 to 4 feet high. The heap should be kept moist, and for this purpose all refuse water from the house, slops, urine, &c., should be added. The heap may be conveniently watered by making a hole into the interior and pouring the liquid in. The final covering with earth has the object of absorbing any ammonia which is evolved in the process of fermentation and by the action of the lime.

When the heap has been prepared it must be left for some time to allow fermentation to take place. Probably a few months will be sufficient, unless very refractory substances, such as bone, &c., are present. Then it should be well forked over and another layer of lime and finally one of earth should be added. In the course of another month or two it should be ready for use, and will provide an excellent manure, rich in humus, at a very slight cost. It will have utilised for the purpose a great amount of material that would otherwise be lost or burnt. When refuse material is burnt the ashes, though still possessing manurial value on account of the lime, potash, and phosphates they contain, are of incomparably less value than the original substances out of which they are derived, owing to the absence of humus material and of nitrogen, which have been lost in the process of burning.

Instead of a heap the compost may be conveniently prepared in a pit. In either case the bottom should be cemented, or so drained that the liquid escaping from the mass can be collected and returned to the compost.

A second heap should be prepared while the first one is ripening, and being used. If it is desired to use superphosphate, potash, ammonium salts, and other concentrated fertilizers, they may be mixed with compost manure before it is added to the soil. Used in this way greater benefit will be derived than if they were applied direct to the soil, and there will be less danger of leaching.

Toil or Talk ?

This from the "Southland Times" (N.Z.). For "New Zealanders" we could well read "Australians": New Zealanders must overcome the prejudice against goods made in their own country and become more self-reliant. Undoubtedly hard work is essential, but intelligence and the application of science are equally necessary. Our Prime Minister assures us that good times are ahead. While there is no reason to doubt this, we must not forget that prosperity will not come merely through the toil of the farmer and the talk of the rest.

Facts Wanted.

"Accurate observation in social life is one of the great things needed in the present day. In economic questions it is obvious to me that people confuse what they would like to be with what they think is. That is particularly so in such questions as the standards of life, the levels of wages, and in all questions relating to money. Half of our economic fallacies are rooted in the problems of the changes in the value of money. We cannot get any fact in relation to modern life in its right sense unless we throw up the purely selfish standpoint. We want in our solution of social questions a passion for facts and not for blame, and the power to appreciate their setting in the complete system of thought."—Sir Josiah Stamp, in the "Dominion" (N.Z.).

Looking Forward—A New Spirit of Co-operation.

I think the outlook for the future affords grounds for reasoned optimism. It may be that it is brighter when we look back and compare it with the troubled times from which we have emerged. First and foremost there is the new spirit of co-operation and goodwill between employer and employed in which the human element is the key-note. The human element plays an enormous part in industrial relations. It is as necessary to study that human element as regards the workers as it is to study new methods, new ideas, and new organisation. The status of being consulted, where appropriate and where possible, is the natural aspiration among the workers. The tendency in this direction must help forward the improved relations in industry.—The Prince of Wales, in a recent important public address.

Lucerne Land.

It is seldom safe for a farmer to say that lucerne will not grow profitably on his land before he has tried it. It is usually associated with rich alluvial soils, but while the best results are obtained from such land, it also thrives on a wide range of soils that do not possess the depth or fertility of the rich alluvials. It is sensitive in certain respects, and disregard of its special susceptibilities will result in reduced yields, but payable results may be expected from almost any land except that which is badly drained or is very sandy. The plant roots very deeply, and it is obvious that a deep, permeable subsoil contributes to maximum results; but this is not an absolute essential to successful growth, as is proved by the results obtained on soil that at one time would have been considered quite unsuitable.—A. and P. Notes, N.S.W. Dept. Ag.

Car Springs—Lubricating the Leaves.

Springs, as a rule, unless in use for a considerable period, do not call for much attention from the owner-driver, other than the shackle bolts. After a car has, however, been in use for some considerable time, the springing usually becomes harsh, due, of course, to the lack of lubricant between the leaves. The only satisfactory way to overcome this defect is to dismantle the springs and to clean all the rust away thoroughly, filling the interstices with grease afterwards. The tip end of each leaf, however, will usually be found to have dug into the fellow leaf above it (in the case of semi-elliptic springs), which gives rather a jumpy movement to the spring when it has been greased. The best thing to do (while the spring is dismantled) is to hammer back the tips of the leaves so that the grooved portion of the next leaf will not foul the tip. In this way a means of lubricating the extreme end of the leaf is made, which operation can be effected by sliding the hand or rag covered with grease along the underside of the spring. The outer tip is a very heavily loaded part, and is very often the cause of squeak. By employing the method outlined, this can be avoided entirely.

Motor Car a Rural Necessity.

One of the most natural tendencies of healthy-minded, civilised citizens is to fraternise, to discuss their avocations, the topics of the day, politics, and pastimes.

Such intercourse is in itself a sign of civilisation and a most desirable condition among residents of widespread, rural districts.

The advent of the motor-car has made reasonable intercourse among country people practicable and thus has largely removed the isolation and privation that breeds desolation and despair.—“Country Life.”

The Making of Men.

When a man leaves school or college his education is not complete—it is merely beginning. Other things being equal, the university man should have a better foundation on which to build than his rival straight from school, but if in after life he neglects his opportunities that foundation alone will not carry him very far. There are born leaders of men and there are born administrators, but we cannot trust to a sufficient supply from that source, and it is desirable that men should be trained. The tragedy of our time is that in every sphere of life many good men of great natural ability are condemned to comparative obscurity by the jealousy and ignorance of those who have it in their power to keep them back. It is a fallacy to suppose that good men always come to the top. Some are broken by the way.—“The Times Engineering Supplement.”

TOP-DRESSING.

A SOUTHERN GRAZIER'S EXPERIENCE.

Interesting tests to ascertain the value of top-dressing grass lands have been conducted during the past year by Mr. E. H. B. Weaver, on his Wynola property. A paddock of 300 acres was selected for the purpose, and the owner decided to keep strict records concerning this area. It was top-dressed with superphosphates at the rate of 1 cwt. to the acre, and for the purpose a special machine was purchased, said to be the first of its kind sold in New South Wales.

Rainfall records showed that 1,198 points of rain fell from April to September, a period of six months, and the carrying capacity of the paddock was definitely trebled. The best results, however, were obtained during the last six months, from October to the end of March, when the total rainfall was 835 points—slightly below the average.

The top-dressed paddock responded to every shower of rain, and the carefully kept records show that the carrying capacity averaged four sheep to the acre for the whole period. This allows for ten to fourteen days' spell following each fall of rain.

Mr. Weaver states that he has carried 800 to 1,400 sheep on the 300 acres for the twelve months, and the longest period the sheep have been out of the paddock was fourteen days. From information obtained in Victoria it is understood that the effect of the manure will last for two years. The total cost of top-dressing, including the cost of manure and a man's wages, amounted to 7s. 6d. an acre. Even if the carrying capacity were only increased to the extent of doubling it, it is a better investment than buying an additional property with all its extra costs and more difficult control.

As previously stated, the rainfall from April to September, 1926, was heavy, and there was an abundance of grass everywhere without the aid of manure, but for the remaining six months of the year the fall was below the average, and the manure had the effect of sustaining a good coat of grass right through.

Mr. Weaver states that the grass paddock in which the experiment was carried out was the only one on “Wynola” to escape damage by bush fires, and as a result he was enabled to complete his test for the year. Many persons contend that the Forbes district is not suitable for top-dressing (Mr. Weaver says), but he is of the opinion that the carrying capacity can comfortably be doubled by carrying out treatment such as described. He intends to top-dress additional areas with the aid of superphosphate, and he is certain there will be no difficulty in increasing the average carrying capacity of the whole property.—“Farmer and Settler.”

Orchard Notes for July.

THE COASTAL DISTRICTS.

The marketing of citrus fruits will continue to occupy the attention of growers. The same care in the handling, grading, and packing of the fruit that has been so strongly insisted upon in these monthly notes must be continued if satisfactory returns are to be expected. Despite the advice that has been given over and over again, some growers still fail to grasp the importance of placing their fruit on the market in the best possible condition, and persist in marketing it ungraded; good, blemished, and inferior fruit being met with in the same case. This, to say the least, is very bad business, and as some growers will not take the necessary trouble to grade and pack properly, there is only one thing to do, and that is to insist on the observance of standards of quality and see that the fruit offered for sale complies with the standards prescribed, and that cases are marked accordingly.

Where the crop has been gathered, the trees may be given such winter pruning as may be necessary, such as the removal of broken or diseased limbs or branches, and the pruning of any superfluous wood from the centre of the tree. Where gumming of any kind is seen it should be at once attended to. If at the collar of the tree and attacking the main roots, the earth should be removed from around the trunk and main roots—all diseased wood, bark, and roots should be cut away, and the whole of the exposed parts painted with Bordeaux paste.

When treated do not fill in the soil around the main roots, but allow them to be exposed to the air for some time, as this tends to check any further gumming. When the gum is on the trunk or main limbs of the tree cut away all diseased bark and wood till a healthy growth is met with and cover the wounds with Bordeaux paste.

If the main limbs are infested with scale insects or attacked by any kind of moss, lichen, or fungus growth, they should be sprayed with lime sulphur.

Towards the end of the month all young trees should be carefully examined for the presence of elephant beetles, which, in addition to eating the leaves and young bark, lay their eggs in the fork of the tree. When the young hatch out they eat their way through to the wood and then work between the wood and the bark, eventually ringbarking one or more of the main limbs, or even the trunk. A dressing of strong lime sulphur to the trunk and fork of the tree, if applied before the beetles lay their eggs, will act as a preventive. In the warmer localities a careful watch should also be kept for the first appearance of any sucking bugs, and to destroy any that may be found. If this is done systematically by all growers the damage done by this pest will be very much reduced.

Citrus trees may be planted throughout the month. Take care to see that the work is done in accordance with the instructions given in the June notes. All worn-out trees should be taken out, provided the root system is too far gone to be renovated, but when the root system is still good the top of the tree should be removed till sound, healthy wood is met with, and the portion left should be painted with a strong solution of lime sulphur. If this is done the tree will make a clean, healthy growth in spring.

The inclusion of a wide range of varieties in citrus orchards—and which has been the general practice—is to be deprecated. Even in new plantations there is a tendency to follow the same unprofitable lines. Far too much consideration is given to the vendor's description or the purchaser's appreciation of a particular variety or varieties. Individual tastes must be subordinated to market requirements, and the selection of varieties to the best available kind of early, medium, and late fruits. Amongst oranges Joppa should be placed first, Sabina for early fruit, and Valencia or Loon Giru Gong for late markets.

In mandarins local conditions influence several varieties, and since the introduction of the fungus known as "scab" the inclusion, particularly on volcanic soil, of the Glen Retreat and Emperor types is risky. In alluvial lands, Emperor and Sovereign (an improved Glen Retreat) are the most profitable, though Scarlet in many places is worth including, with King of Siam as a late fruit. This commanded the highest price realised for mandarins last season.

Land intended for bananas and pineapples may be got ready, and existing plantations should be kept in a well-cultivated condition so as to retain moisture in the soil.

Bananas intended for Southern markets may be allowed to become fully developed, but not coloured, as they carry well during the colder months of the year, unless they meet with a very cold spell when passing through the New England district of New South Wales.

The winter crop of smoothleaf pines will commence to ripen towards the end of the month, and when free from blackheart (the result of a cold winter) or from fruitlet core rot, they are good for canning, as they are of firm texture and stand handling. Where there is any danger of frost or even of cold winds, it pays to cover pines and also the bunches of bananas. Bush hay is used for the former, and sacking for the latter.

Strawberries should be plentiful during the month, provided the weather is suitable to their development, but if there is an insufficient rainfall, then irrigation is required to produce a crop. Strawberries, like all other fruits, pay well for careful handling, grading, and packing, well-packed boxes always realising a much higher price than indifferently packed ones on the local market. Where strawberries show signs of leaf blight or mildew, spray with Bordeaux mixture for the former and with sulphide of soda for the latter.

When custard apples fail to ripen when gathered, try the effect of placing them in the banana-ripening rooms, and they will soon soften instead of turning black.

THE GRANITE BELT, SOUTHERN AND CENTRAL TABLELANDS.

July is a busy month for the growers of deciduous fruits, as the important work of winter pruning should, if possible, be completed before the end of the month, so as to give plenty of time for spraying and getting the orchard into proper trim before spring growth starts.

In pruning, follow the advice given in the June number; and if you are not thoroughly conversant with the work, get the advice of one or other of the Departmental officers stationed in the district.

Pruning is one of the most important orchard operations, as the following and succeeding seasons' crops depend very largely on the manner in which it is carried out. It regulates the growth as well as the number and size of the fruit, as if too much bearing wood is left, there is a chance of the tree setting many more fruits than it can properly mature, with a result that unless it is rigorously thinned out, it is undersized and unsaleable. On the other hand, it is not advisable to unduly reduce the quantity of bearing wood, or a small crop of overgrown fruit may be the result.

Apples, pears, and European varieties of plums produce their fruits on spurs that are formed on wood of two-years' growth or more; apricots and Japanese plums on new growth, and on spurs; but peaches and nectarines always on wood of the previous season's growth. Once peachwood has fruited it will not produce any more from the same season's wood, though it may develop spurs having a new growth or new laterals which will produce fruit.

The pruning of the peaches and nectarines, therefore, necessitates the leaving of sufficient new wood on the tree each season to carry a full crop, as well as the leaving of buds from which to grow new wood for the succeeding year's crop. In other words, one not only prunes for the immediately succeeding crop, but also for that of the following season.

All prunings should be gathered and burnt, as any disease that may be on the wood is thoroughly destroyed. When pruned, the trees are ready for their winter spraying with lime-sulphur.

All kinds of deciduous trees may be planted during the month provided the ground is in a proper state to plant them. If not, it is better to delay planting until August, and carry out the necessary work in the interval. The preparation of new land for planting may be continued, although it is somewhat late in the season, as new land is always the better for being given a chance to mellow and sweeten before being planted. Do not prune vines yet on the Granite Belt; they can, however, be pruned on the Downs and in the western districts.

Trees of all kinds, including citrus, can also be planted in suitable situations on the Downs and western districts, and the pruning of deciduous trees should be concluded there. If the winter has been very dry, and the soil is badly in need of moisture, all orchards in the western districts, after being pruned and ploughed, should receive a thorough irrigation (where water is available) about the end of the month, so as to provide moisture for the use of the trees when they start growth. Irrigation should be followed by a thorough cultivation of the land to conserve the water so applied. As frequently mentioned in these notes, irrigation and cultivation must go hand in hand if the best results are to be obtained, especially in our hot and dry districts.

Farm and Garden Notes for July.

FIELD.—Practically the whole of the work on the land for this month will be confined to the cultivation of winter crops, which should be now making good growth, and to the preparation of land for the large variety of crops which can be sown next month. Early-maturing varieties of wheat may be sown this month. The harvesting of late-sown maize will be nearing completion, and all old stalks should be ploughed in and allowed to rot. Clean up all headlands of weeds and rubbish, and for this purpose nothing equals a good fire. Mangels, swedes, and other root crops should be now well away, and should be ready for thinning out. Frosts, which can be expected almost for a certainty this month, will do much towards ridding the land of insect pests and checking weed growth. Cotton-picking should be now practically finished and the land under preparation for the next crop. The young lucerne should be becoming well established; the first cutting should be made before the plants flower—in fact, as soon as they are strong enough to stand the mowing machine, and the cutting of subsequent crops should be as frequent as the growth and development of the lucerne plants permit. Ordinarily cutting should be regulated to fit in with the early flowering period—*i.e.*, when about one-third of the plants in the crop are in flower.

KITCHEN GARDEN.—Should showery weather be frequent during July, do not attempt to sow seeds on heavy land, as the latter will be liable to clog, and hence be injurious to the young plants as they come up. The soil should not be reworked until fine weather has lasted sufficiently long to make it friable. In fine weather get the ground ploughed or dug, and let it lie in the rough until required. If harrowed and pulverised before that time, the soil is deprived of the sweetening influences of the sun, rain, air, and frost. When the ground has been properly prepared, make full sowings of cabbage, carrot, broad beans, lettuce, parsnips, beans radishes, leeks, spring onions, beetroot, eschalots, salsify, &c. As westerly winds may be expected, plenty of hoeing and watering will be required to ensure good crops. Pinch the tops of broad beans which are in flower, and stake up peas which require support. Plant out rhubarb, asparagus, and artichokes. In warm districts, it will be quite safe to sow cucumbers, marrows, squashes, and melons during the last week of the month. In colder localities, it is better to wait till the middle or end of August. Get the ground ready for sowing French beans and other spring crops.

FLOWER GARDEN.—Winter work ought to be in an advanced state. The roses will not want looking after. They should already have been pruned, and now any shoots which have a tendency to grow in wrong directions should be rubbed off. Overhaul the ferneries, and top-dress with a mixture of sandy loam and leaf mould, staking up some plants and thinning out others. Treat all classes of plants in the same manner as the roses where undesirable shoots appear. All such work as trimming lawns, digging beds, pruning, and planting should now be got well in hand. Plant out antirrhinums, pansies, holy-hocks, verbenas, petunias, &c., which were lately sown. Sow zinnias, amaranthus, balsam, chrysanthemum tricolour, marigold, cosmos, cockscombs, phloxes, sweet peas, lupins, &c. Plant gladiolus, tuberose, amaryllis, panceratum, ismene, crinum, belladonna, lily, and other bulbs. Put away dahlia roots in some warm moist spot, where they will start gently and be ready for planting out in August and September.

AFTER TREATMENT OF THE WHEAT CROP.

The harrowing of the growing crop when it is about 6 inches high is coming more into favour. Harrows certainly drag a few plants out, but when the stand is not already too thin no damage results, as the increased vigour of the crop and the better stooling induced more than make up for any disadvantage. In years when heavy winter rains have fallen, and on heavy land which is inclined to set hard, harrowing in early spring is very beneficial. Harrowing breaks this surface crust and also destroys many weeds. It is also of great advantage even in normal years on all classes of soil in the drier parts of the State, as it helps to conserve moisture by producing a surface mulch. On heavy land harrowing should be completed early in spring, otherwise the land is inclined to become so hard that the harrows will hardly mark the surface.

Rolling is sometimes practised when the crop is 6 to 8 inches high if it is intended to be cut for hay or silage. This is only done to level the surface. Rolling is beneficial on many of the light open soils, especially on the light sandy mallee lands, as it assists in consolidating the soil. Farmers on this class of land would improve their yields by rolling the growing crop. On very heavy soils rolling is not so beneficial.

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S., AND A. C. EGLINTON.

TIMES OF SUNRISE, SUNSET, AND MOONRISE.

AT WARWICK.

MOONRISE.

1927.	MAY.		JUNE.		May.	June.
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Rises.
1	6.19	5.19	6.38	5.2	a.m. 5.31	p.m. 9.50
2	6.20	5.18	6.38	5.2	6.39	10.55
3	6.21	5.17	6.38	5.1	7.46	11.57
4	6.22	5.16	6.39	5.1	8.53	a.m. 1.0
5	6.22	5.16	6.39	5.1	9.55	2.1
6	6.23	5.15	6.39	5.1	10.54	3.2
7	6.23	5.15	6.40	5.1	11.47	p.m. 4.3
8	6.24	5.14	6.40	5.1	12.33	5.2
9	6.24	5.13	6.41	5.1	1.11	6.1
10	6.25	5.12	6.41	5.1	1.50	6.58
11	6.25	5.11	6.41	5.1	2.23	7.54
12	6.26	5.11	6.42	5.1	2.54	8.45
13	6.26	5.10	6.42	5.1	3.24	9.32
14	6.27	5.10	6.43	5.1	3.53	10.14
15	6.27	5.9	6.43	5.1	4.24	10.53
16	6.28	5.9	6.43	5.1	5.0	11.28
17	6.29	5.8	6.44	5.1	5.36	p.m. 12.2
18	6.30	5.7	6.44	5.2	6.19	12.33
19	6.31	5.6	6.44	5.2	7.5	1.6
20	6.32	5.6	6.44	5.2	7.58	1.39
21	6.32	5.5	6.44	5.2	8.55	2.16
22	6.33	5.5	6.44	5.3	9.55	2.56
23	6.33	5.5	6.44	5.3	10.58	3.41
24	6.34	5.4	6.45	5.3	a.m. 12.19	4.30
25	6.34	5.4	6.45	5.3	1.5	5.29
26	6.35	5.3	6.45	5.4	2.9	6.31
27	6.35	5.3	6.45	5.4	3.14	7.38
28	6.36	5.3	6.45	5.5	4.19	8.45
29	6.36	5.2	6.45	5.5	5.25	9.50
30	6.37	5.2	6.45	5.5	6.32	...
31	6.38	5.2	...	...	...	...

Phases of the Moon, Occultations, &c.

The times stated are for Queensland, New South Wales, Victoria, and Tasmania.

7 June	(First Quarter	5 48 p.m.
15 "	○ Full Moon	6 19 p.m.
22 "	) Last Quarter	8 29 p.m.
29 "	● New Moon	4 32 p.m.

The greatest astronomical event of this month will be the total Eclipse of the Sun on the 29th observable across the narrowest part of England, Scandinavia, etc., but not in Australia. The previous total Eclipse of the Sun in England was in 1724, and the next will be in 1999.

A fortnight earlier an interesting total Eclipse of the Moon will occur—eighteen minutes before the moon rises at Warwick it will enter the Umbra or the darkest part of the earth's shadow. An hour and a half later it will be totally eclipsed and a total Eclipse will occur. Instead of the usually bright, full-orbed Moon it will most probably have a darkened, copper-coloured appearance.

The occultation of Iota Leonis on the 7th about 8.30 p.m. will be observable in Southern Queensland. It will be about 50 degrees above the horizon in the north-west, and in a favourable position for observation.

The occultation of Saturn about 4 o'clock in the morning on the 14th will form an interesting spectacle in the west. The planet will disappear near the southern edge of the Moon at any place as far south as Toowoomba and Warwick.

The conjunction of Venus and the Moon at 4 p.m. on the 3rd, being at an angle of 45 degrees from the Sun should afford an interesting daylight spectacle towards the north-north-west.

Venus and Mars will be apparently very close to one another in the west-north-west soon after sunset on the 9th, 10th and 11th.

Mercury will be at its greatest elongation, twenty-five degrees east on the 22nd, when it will be in the Constellation Gemini near the left foot of Castor, which is marked by two stars of the third and fourth magnitudes. As the twilight deepens Mercury will be the most noticeable object towards the horizon north of west, while a good way above it will be Mars and the still brighter planet Venus.

The Sun will reach its greatest northern declination on the 22nd when the Australian Winter Solstice will occur.

For places west of Warwick and nearly in the same latitude, 28 degrees 12 minutes S., add 4 minutes for each degree of longitude. For example, at Inglewood, add 4 minutes to the times given above for Warwick; at Goondiwindi, add 8 minutes; at St. George, 14 minutes; at Cunnamulla, 25 minutes; at Thargomindah, 33 minutes; and at Oontoo, 43 minutes.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhat about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

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